(40) The Prosodic Subcategorization Schema

ALIGN(*afx*, {L, R}, *pivot*, {L, R})

Where *pivot* is…

an initial consonant or vowel,
a final syllable or vowel, or
a stressed foot, syllable, or vowel.

Yu further argues that all such constraints (i.e., morphologically indexed alignment constraints) must *universally* dominate all phonological constraints—familiar markedness and faithfulness constraints not specific to particular morphemes. The result, for Tagalog at least, is a system of constraints in which the rankings of phonological constraints in the grammar is completely irrelevant to the workings of *um*-infixation.

(41) The Prosodic Subcategorization Analysis of *um* infixation

◇ ALIGN(*um*) := ALIGN(*um*, R, V_1, L)

/um+sulat/ → s-um-ulat	ALIGN(*um*)	DEP	ONSET	NOCODA
a. ~ *Cum-sulat		W		W
b. ~ *um-sulat	W		W	
c. ~ *sul-um-at	W			

The descriptive power of Yu's approach is not to be doubted. This is primarily because—as we can see from the very narrow formulation of the constraint in (41)—the account is formally little more than a bundling of descriptive generalization into an OT-friendly format. It is in fact somewhat puzzling why Yu couches his account within OT at all. Since all morphological constraint are argued to dominate all phonological constraints, Yu's theory of morpheme positioning is formally no more insightful than one which positions morphemes within the string by simple word-formation rule and then feeds the result to a phonological grammar. This follows because the ranking of phonological constraints in the grammar is largely irrelevant to the positioning of the morpheme in the output—phonological constraints may dictate the final form of the morpheme, but may never move it from the position dictated by universally undominated prosodic subcategorization constraints. This leads to an obvious loss of linguistic generalization. In the example above, for instance, there is no sense in which the phonology of Tagalog contributes to the alternation. The account completely ignores the obvious: that the language infixes to avoid onsetless syllables.

The approach does bring with it a benefit, however. The hyperinfixation problem does not arise in Yu's theory (just as it does not arise in rule-based, pre-OT theories) precisely because the theory bereaves the phonological grammar of any ability to affect morpheme position one way or the other. The only resolution strategy available to the grammar is null-parsing of the entire string in cases such as **m-um-ahal*.

It is far from apparent, however, that this lone benefit justifies the numerous shortcomings inherent to the theory. Note additionally that, under this maximally exogenous approach, any hope of a unified account of hyperinfixation and hypermetathesis together is lost, since morpheme alignment is inapplicable to cases of metathesis. An additional shortcoming of the theory in the bizarre typological predictions of what we'll call *bitropic morpheme effects*. Yu restricts the space of possible edges to which morphemes may align—the set of 'pivots' given above. He explicitly allows, however, for morphemes which are subject to more than one alignment constraint. Where opposed-edge alignment constraints (i.e., two or more constraints pulling the exponence of the affix to opposite edges of an output string) occur for a particular morpheme (and nothing, in Yu's theory, restricts them in any way), the lowest-ranked faithfulness constraint in the grammar, regardless of a) how low it is in the ranking or b) the kind and quantity of markedness constraints that dominate it, will chose the optimal candidate, often with bizarre results. If that faithfulness constraint is MAX, for instance, we expect a morpheme that simply deletes when 'affixed' to any given root.

(42) Disappearing exponence

	/ba_{afx} + $digi_{rt}$/	ALIGN(AFX, R, C_1, L)	ALIGN(AFX, L, V_{fin}, R)	MAX
	a. ba-digi		*!	
	b. digi-ba	*!		
	c. ba			***!*
☞	d. digi			**

Similarly, where INTEGRITY is the lowest-ranked faithfulness constraint, we expect a kind of faux reduplication, where an affix is copied to both ends of the string to satisfy the undominated alignment constraints. Such is unattested in natural language.

(43) Discontinuous 'reduplication'

	/ba_{afx} + $digi_{rt}$/	ALIGN-L(AFX, PRWD)	ALIGN-R(AFX, PRWD)	INTEGRITY
	a. ba-digi		*!	
	b. digi-ba	*!		
☞	c. ba-digi-ba			*

A third potential opposed-edge alignment morpheme has actually been argued for in the literature. Where opposed alignment constraints dominate UNIFORMITY (or any other constraints, like those of the IDENT family, mitigating against fusion of segmental or featural matter) an affix may be realized as a kind of word-level feature harmony, where some feature(s) of the morpheme spread over the exponence of the root in the output.

(44) Harmony-inducing affixation

	/ba_{afx} + $digi_{rt}$/	ALIGN-L(AFX, PRWD)	ALIGN-R(AFX, PRWD)	UNIFORMITY
	a. ba-digi		*!	
	b. digi-ba	*!		
☞	c. $\{digi\}^{lab}$			*

Akinlabi (1997) makes an almost identical ranking argument in accounting for numerous cases of morphologically-governed feature spread. We will show in Ch. 3 that, while this approach captures the descriptive character of these harmony-inducing affixes in a straightforward way, it fails to connect them with larger generalizations of the languages in question.

Lastly, as Yu himself notes, there are cases of infixation which the theory simply cannot account for, those wherein a morpheme attaches, descriptively speaking, to more than one 'pivot' in a paradigm. A relevant case, again from Yu (p. 215), is found in Kentakbong (Omar 1975), where an imperfective marker appears as a prefix [ʔen] before monosyllabic roots, but an infix [ən] in disyllabic roots.

(45) Kentakbong Infixation

a. afx ⇒ __ C_1

/co/ → ʔənco 'speaks.IMPRF'
/cãs/ → ʔən-cãs 'excretes.IMPRF'

b. afx ⇒ __ V_1 (or C_1 __)

/citɔh/ → c-ən-itɔh 'cooks.IMPRF'
/sapoh/ → s-ən-apoh 'sweeps.IMPRF'

Such facts are inexplicable in a theory that explicitly disallows the domination of morpheme-alignment by phonological well-formedness constraints. Under standard OT assumptions, there must be a fixed ordering of the alignment constraints in the morphological statum, and so there should exist only one surface positionoutputting of the morpheme, that demanded by the highest ranked constraint. Yu's universal prohibition on the prosodic morphology (P >> M) ranking explicitly rules out any ranking in which, for example, a positional faithfulness constraint (McCarthy 1997, Beckman 1998) penalizing infixation in a (highly salient) word-final syllable could dominate the prosodic subcategorization constraints in question. Such an account would predict the observed positional alternation straightforwardly, without the loss of a significant linguistic generalization. The best account of these facts under Yu's assumptions—that [ʔən] and [ən] are distinct, yet synonymous morphemes subject to distinct sets of alignment constraints—explains *nothing* about the alternation from any synchronic standpoint. We may as well add Tagalog to the list of such problematic languages, inasmuch as it is not clear from loanword infixation whether the best 'pivot' for the infixation is the left edge of the first vowel or the right edge of the first consonant.

These problems, along with the larger body of criticisms made in Chapter One to morpheme-specific alignment generally, should give the morphophonologist considerable pause before accepting Yu's theory in whole or part.

2.5. A universal prohibition on hyperinfixation?

It has been argued (Yu 2003) that hyperinfixation is not linguistically possible, i.e., a Tagalog′, where *um* occurs several syllables into roots with sonorant labials, should be ruled out by any theory of infixation. There are two arguments—one formal and one empirical—against such a prohibition.

First, it is difficult to characterize exactly what hyperinfixation *is* in any formally rigorous sense. Intuitively speaking, hyperdislocation is non-local dislocation, that occurring when an input element migrates 'excessively' far from its input orientation to satisfy other undominated constraints. Formally, however, this is a difficult phenomenon to characterize, primarily because of the difficulty in stating concretely what it means for a dislocated element to be 'local' to a particular position in the output. There is a distinct sense of what it means for an element to be input-local to a morphological category edge-exhaustive linearization encodes basic concatenative precedence relations among morphemes and the segments within them as determined by the morphosyntax. What does it mean for an element to be output-local, however? If a segment is dislocated one segment from its origin (or even a particular category edge), is it local? What about three segments, or ten? It is difficult to state in absolute terms exactly how far an element may move from its input position and still be observably local to that position, and therefore impossible to define hyperinfixation in terms of degree of dislocation. It is equally difficult to characterize the phenomenon in terms of paradigmatic consistence. Across the Tagalog actor-focus paradigm, there exists a formally explicable generalization that infixation occurs over initial segments. We might say then that 'hyperinfixation' in the paradigm would any infixation beyond that first segment. But we have also seen that infixation can occur over what has been characterized as a complex onset. Why is infixation over three segments in **mah-um-al* more inconsistent with the actor-focus infixation pattern than *pr-um-eno*? It seems questionably sound to argue in favor of a universal prohibition on a phenomenon that defies coherent description.

Second, there are a range of phenomena that suggest the linguistic *possibility* of such a phenomenon. Note, for example, the existence of 'edge-flipping' morphology, attested in a variety of languages. Though cases such as those below do not show exactly the kind of hyper-dislocational alternation observed under the hypothetical Tagalog ranking discussed in §2, they do show migration of an affix to the very opposite end of the root or stem.

(46) Edge-flipping affixation

a. Huave tense (Noyer 1993)
{TNS < CAUS < ROOT}: t-a-wit' 'PST-TH-raise'
{ROOT < REFL < TNS}: wit'-i-t 'raise-TH-PST'

b. Afar 2nd person (Fulmer 1997)
{ROOT < PERS < ASP}: yab-t-à 'speak-2-IMPF'
{PERS < ROOT < ASP}: t-okm-è '2-eat-PERF'

c. Mangap-Mbula reduplication (Spaelti 1997)
{ROOT > RED}: pósopsop 'you (sg) be finishing'
{RED > ROOT}: badbáada 'you (sg) be carrying'

Previous accounts have shown in each case that the 'mobile' property of these morphologies is typically the result of some simple constraint on prosodic well-formedness. In the Huave case, Noyer (1993) argues with some success that the high ranking of a constraint mandating prosodic words to end in a final consonant predicts the distribution of the tense morpheme: prefixal, unless the resulting word would end in a vowel. Fulmer (1997) argues that the juxtaposition of root and person morphemes in Afar results from a the high-ranking of ONSET: the tense marker is suffixal unless it may syllabify into the onset of the first root syllable. Lastly, Spaelti (1997) shows that the reduplication pattern in Mangap-Mbula results from an imperative to preserve the stress pattern found in the underived word: the reduplicant is suffixal unless it would force a stress shift in the base of affixation. In each case, the surface morphological 'polarity' of the morpheme (prefixal or suffixal) is changed.

While these cases do not show alternation of a 'prefixal' infix with a suffix, as in hyperinfixing Tagalog′, such an alternation is found in a case of morphologically conditioned infixation. A case of infixation in Choctaw (Nicklas 1975, Stemberger and Bernhardt 1998) provides an instructive example of infixation which seems to change its observational polarity on a purely contextual basis.

(47) Choctaw h-infixation

a. <u>Suffixal</u>
pisa-či → pisa-h-či 'show'

b. <u>Infixal</u>
pisa → pi-h-sa 'see'
čito → či-h-to 'big'

c. <u>Prefixal (root = *bi*)</u>
sa-bi → sa-h-bi 'he kills me'
či-bi → či-h-bi 'he kills you'

d. <u>Infixal (into prefix)</u>
iš-bi → i-hi-š-bi 'you (sg.) kill him'
ĩ:-pa → i-h-ĩ:-pa 'eat (intr.)'

Stemberger and Bernhardt (1998) argue that conflicting alignment constraints (of the type argued against repeatedly in this work) effectively delimit a single-syllable template over which the morpheme must infix. While we will see an account of nearly identical infixation facts in Alabama in §2.2.1 that will not require parochial alignment at all, Stemberger and Bernhardt's essential point remains valid. The case shows that (here morphological) factors may conspire to produce a wildly varying landing site for a segmental morpheme. Again we have case which, while not a direct attestation of the prosodically inspired hyperinfixation case in Tagalog′, at least runs very parallel to it.

It would seem that the unattested infixation in Tagalog′ is, if not typologically robust, at least within the realm of the linguistically possible. If no case precisely matching Tagalog′ is to be found, an explanation may be found in a number of factors not directly affecting an analysis hinging on prosodic infixation. First, it is observable that infixation is a singularly rare affixational process (Hall 1992); it is hardly surprising that a furthermore rare type of positional allomorphy should be found compounded with it. Second, the typological 'gap'—if in fact it is such—may well result less from a property of formal grammar and more from a fact of diachronic tendency. Infixation of the types we have discussed thus far have been argued to result from phonological weakening at morpheme edges which leads first to interdigitation (metathesis) of morphemes and ultimately to infixation (Haiman 1998, Moravcsik 2000). If this evolutionary tendency is true, it stands to reason that a language learner would simply never be exposed to a hyperinfixed word, and thus would never consider a grammar which would productively produce such. In other words, the phenomenon is formally possible, but diachronically unfeasible, a state of affairs argued by Myers (2002) to hold over a number of theoretically unavoidable but typologically unattested phonological phenomena.

3. Infixation/Metathesis Interaction

The parity of analysis that restricts hypermetathesis in the one case and hyperinfixation in the other demonstrates the close relation of metathesis and infixation in the current theory. Alignment-based approaches to PoE, on the other hand, predict no necessary correlation between the types of dislocation in this way: infixation is a function of {$\mathbb{C}$ >> ALIGN$_{\text{morpheme}}$}, where $\mathbb{C}$ is some set of constraints that condition dislocation; metathesis is a function of {$\mathbb{C}$ >> LINEARITY} for a potentially identical $\mathbb{C}$ under the traditional assumption that there are no input precedence relations between distinct morphemes. This results in a loose four-way typology, abstracting away from other phonological factors that could influence the presence or absence of a particular process in a particular language.

(48) Typology of {ALIGN(m), LINEARITY, $\mathbb{C}$}

Grammar	*infix*	*metathesize*
ALIGN(m), LINEARITY >> $\mathbb{C}$	no	no
ALIGN(m) >> $\mathbb{C}$ >> LINEARITY	no	yes
LINEARITY >> $\mathbb{C}$ >> ALIGN(m)	yes	no
$\mathbb{C}$ >> ALIGN(m), LINEARITY	yes	yes

In the proposed theory, the prediction is radically simpler: if {$\mathbb{C}$ >> LINEARITY}, then both processes are at least potentially available in the language, modulo the nature of the markedness constraint(s) dominating LINEARITY and the segmental make-up of involved morphemes. Thus it is incumbent upon us, when considering a language like Tagalog, to explain not only why infixation occurs to avoid a certain marked structure in a language, but why metathesis doesn't (and v.v.).

Stemberger and Bernhardt (1998) argue similarly that infixation and metathesis across morpheme boundaries are ultimately the same phenomenon. Both involve the *interdigitation* (their term) of two or more morphemes. Infixation, as we have seen, interposes an entire morpheme within another, and, in cases traditionally referred to as metathesis, a portion of a morpheme (i.e., a segment) is so interposed. Stemberger and Bernhardt argue that the formal distinction between infixation and metathesis across morpheme boundaries is reducible to variation in ranking between prosodic well-formedness or phonotactic constraints and the affix- and root-specific variants of another relational faithfulness constraint: the CONTIG(uity) constraint of McCarthy and Prince (1999).

(49) I-CONTIG ('No skipping.') (McCarthy and Prince 1995)

The portion of S1 standing in correspondence forms a contiguous string.
Domain($\Re$) is a single contiguous string in S1.

In cases of infixation, Stemberger and Bernhardt argue that a high-ranked $\text{CONTIG}_{\text{AFX}}$ prevents polysegmental affixes from splitting; $\text{CONTIG}_{\text{ROOT}}$ is dominated by some markedness constraint. Inderdigitation, on the other hand, results with the violation of both adjacence-faith constraints.

(50) Infixation: $\{\text{CONTIG}_{\text{AFX}}, \text{M} >> \text{CONTIG}_{\text{ROOT}}\}$
Interdigitation: $\{\text{M} >> \text{CONTIG}_{\text{AFX}}, \text{CONTIG}_{\text{ROOT}}\}$

As it turns out, however, this is not all that need be said of infixation/metathesis interactivity in the current theory. Observe three potential problems remaining to the account.

■ Constraints expected to produce infixation in a particular language can, under the right circumstances, be unexpectedly better satisfied by morpheme-internal metathesis. Contiguity constraints cannot rule out metathesis in bisegmental sequences; XY may become YX without any change in adjacency relations. How then do we rule out such homomorphemic metathesis for particular processes in a language?

■ Likewise, the reverse can hold, where expected metathesis might be better satisfied by infixation. Once we have established a preference in a language for heteromorphemic metathesis, how can homomorphemic dislocation occur at all?

■ More alarmingly yet, it is possible for both infixation and metathesis to occur within a single paradigm. How can a single ranking that prefers one over the other allow both simultaneously?

All of these problems come to light in further consideration of Tagalog's various dislocational phenomena. In the actor-focus (i.e., *um-*) paradigm, homomorphemic metathesis must be ruled out as a potential repair of illicit syllable structure. In a set of syncopating roots, infixation must be prevent from occurring across morpheme boundaries. And in the goal-focus (i.e., *in-*) paradigm, free variation among infixed and metathetic candidates must be accommodated in certain phonological environments.

(51) Tagalog dislocation processes

Process	*infixation?*	*metathesis?*	*Example*
um infixation	yes	no	/um+sulat/→s-um-ulat, *mu-sulat
metathetic syncope	no	yes	/talab+an/→talb-án ~ tabl-án
in infixation	yes	yes	/in+linis/→l-in-inis, ni-linis

We will consider each of the problems posed by these cases in the following sections, and posit approaches to them that will stand as exemplars for similar problems occurring in other languages. Metathesis will be ruled out in the *um*-infixation paradigm through the ranking of a homomorphemic variant of LINEARITY, which we will go on to show relevant in accounts of dislocation as a morphologically derived environment effect.

Infixation will be in turn ruled out in certain syncope cases through judicious formulation of conditioning markedness constraints. We will see variation in infixation/metathesis in the *in* paradigm to be similarly conditioned by phonotactic pressures in the language.

3.1. Infixation and homomorphemic LINEARITY

An obvious problem with the simple approach to prosodic infixation we presented in the previous sections must be observed at this point, and an expansion made to our theory of precedence faith. Consider a case where ONSET could be perfectly well satisfied by prefix-internal metathesis. As tableau (52) shows, an ungrammatical metathesis candidate outperforms infixation on LINEARITY, since the constraint will prefer the coda-less candidate with the least amount of precedence loss *in toto*.

(52) Incorrect prediction of {ONSET >> LINEARITY}

	/um+tawag/	ONSET	LINEARITY
	a. um.ta.wag	*!	
☞	b. tu.ma.wag		**!
☛	c. mu.ta.wag		*

Some other mechanism must then be called upon to rule out the unattested metathesis candidate (c) above—i.e., something must prevent the alternation of infixation with morpheme-internal metathesis. We will take the mechanism in question to be a variant of LINEARITY that preserves only homomorphemic precedence between correspondent strings.

(53) HOM(omorphemic)LIN(earity)

Homomorphemic precedence relations in S_1 are preserved in S_2.
If $x, y \in S_1$ **and** $x, y \in \mathbf{M}$, then $x < y$ iff $\neg[Y' = \{y' \in S_2 \mid y'\Re y\} < X' = \{x' \in S_2 \mid x'\Re x\}]$.

HOMLIN preserves only those precedence relations internal to a morpheme, making no consideration of the precedence relations obtaining between segments of *distinct* morphemes. The ranking of HomLin with Onset rules out the unattested metathesis case quite effectively (shown below).[28]

(54) Infixation ≠ Metathesis: /um+tawag/ → [tu.ma.wag], *[mu.ta.wag]

	/um+tawag/	Onset	HomLin	Linearity
	a. um.ta.wag	*!		
☞	b. tu.ma.wag			**
	c. mu.ta.wag		*!	

With any novel formulation of a constraint, new typological predictions are made; the HomLin proposal is no different, making explicit predictions about types of dislocation in natural language. In rough typological terms, we may predict some of the environment in which infixation and metathesis are predicted to apply: across the board, that is, both internal to morphemes and across morpheme boundaries; in morphologically derived environments (MDEE) only; and of course not at all. The rankings generating these various dislocation types, and cases of infixation and metathesis that exemplify them, are shown below.

(55) Simplified typology of dislocation types

	Ranking(s)	*Dislocation occurs...*	*Example*
a.	𝕄 >> Linearity, HomLin	across the board	Fur Metathesis (Jakobi 1990)
b.	HomLin >> 𝕄 >> Linearity	in derived environments	Georgian Metathesis (Butskhrikidze and van de Weijer 2001); Kashaya Infixation (Buckley 1997)
c.	Linearity >> 𝕄; HomLin	not at all	n/a

Metathetic processes typically occur in an across-the-board fashion. The partial ranking in (A) can be seen, for example, in the Biltine language Fur (Jakobi 1990, Hume 2001), where the onset cluster [kb] is banned word-initially, both in monomorphemes and in

[28] There is only one other type of metathetic process that could satisfy the ranking, what we'll call C-V interleaving, and it would be observable only where an underlying VC sequence could not acquire a surface onset from some other source. Homomorphemic C-V interleaving (/~VVC~/ → ~V.CV~) is ruled out in Tagalog by the ranking in (54). More interestingly, the heteromorphemic variety (/~VV+C~/ → ~V.CV~) is similarly unattested. While this might have more to do with the absence of appropriately shaped morphemes in the language than anything else (there are no combinations of morphemes which fit the above template exactly), we can observe that other constraints may be brought in to rule out the process, where the appropriate structural configurations obtain.

derived environments, as in /k+ba/ → [k-ab], *[ba-k] 'we drink'. Positing the relevant markedness constraint to be *CxOns, the following ranking of constraints will generate the attested mapping.

(56) Fur Root Metathesis: /k + b_1a_2/ → k-a_2b_1, *b_1a_2-k 'we drink'

/k + ba/ → k-ab	*CxOns	Linearity	HomLin
a. ~ *ba-k		W	L
b. ~ *k-ba	W	L	L

The same {M >> HomLin >> Linearity} ranking drives infixation in Tagalog and could, roughly speaking, predict a language in which metathesis occurs in both mono- and polymorphemic words, but where a *preference* is given to heteromorphemic metathesis in the latter case. In a Fur′, for example, where {*CxOns >> HomLin >> Linearity}, the prediction is that underlying monomorphemic /CCV~/ will always surface as [CVC], effectively barring CCV~ from the language's syllable canon. In polymorphemic words, however, we might expect the same /CCV/ input to undergo metathesis in a different direction when prefixed with a vowel: /V+CCV/ → [CVCV]. I know off hand of no such case. Alternatively, we might propose that our theory of precedence faith contains only constraints complimentary in application, i.e., HomLin above and Het(eromorphemic)Lin(earity) rather than the general Linearity we have put to use thus far. Such a construal of relational faith would provide similar results in the Tagalog case, as well as provide a straightforward account of the Fur case above. In the Tagalog case, only heteromorphemic precedence is lost; whether the constraint that penalizes that loss governs only heteromorphemic precedence or both types of precedence relation is irrelevant. As for the Fur case, where a {HetLin >> HomLin} ranking would obtain, metathesis would only occur within morpheme boundaries. We may rule out such a construal on formal grounds. The existence of a heteromorphemic Linearity suggests that we should have heteromorphemic variants of all relational faithfulness constraints (we will argue for a homomorphemic formulation of a relational faithfulness constraints in Ch.4), and so, in turn, means that there should be a conceptual inverse of MDEE, i.e., processes which occur only in non-derived contexts, and are blocked in derived ones.

Perhaps more interesting is the {HOMLIN >> M >> LINEARITY} ranking, as it allows us to account for certain cases of metathesis as Morphological Derived Environment Effects (Kiparsky 1973, MDEE henceforth). We can see this quite clearly in the case of Georgian *v*-metathesis (Butskhrikidze and van de Weijer 2001). When a labio-velar sonorant, /v/, occurs as a 'thematic' suffix in inflected verbs, it metathesizes with a preceding root sonorant, concomitantly forcing deletion of the root vowel. No metathesis occurs, however, when the root-final consonant is an obstruent.

(57) Georgian *v*-metathesis

a. [+son]v → v[+son]

root	*PRS.3SG*	*INF*	*gloss*
xar	xr-av-s	xvr-a	'to gnaw'
xan	xn-av-s	xvn-a	'to plough'
k'al	k'l-av-s	k'vl-a	'to kill'
k'ar	k'r-av-s	k'vr-a	'to tie'

b. [−son]v → [−son]v

xed	xed-av-s	xed-v-a, *xvd-a	'to see'
tes	tes-av-s	tes-v-a, *tvd-a	'to sow'
les	les-av-s	les-v-a, *lvs-a	'to sharpen'
ber	ber-av-s	ber-v-a, *bvr-a	'to blow up'

Butskhrikidze and van de Weijer (2001) dismiss a fairly straightforward account of these data, namely that they arise from the ranking of a simple contextual markedness constraint—barring sonorant/consonant sequences in the output—over LINEARITY.

(58) *SON<C := Sonorants must not precede consonants.

They do so on the grounds that sonorant/C sequences are widely attested in the language's (quite complex) system of onset clusters, as in examples *rtvel-i* 'harvest', *rk'al-i* 'semi-circle', *rgol-i* 'circle', etc. This most basic of approaches, however, may be maintained in the face of these data with the introduction of HOMLIN to the ranking. Where HOMLIN dominates *SON<C, which in turn dominates LINEARITY, we predict exactly the distribution of [v] metathesis: it occurs across morpheme boundaries where sonorant/C sequences would otherwise be unavoidable. Essentially, we recast the problem in terms of emergence of unmarked structure at morpheme boundaries.

(59) TETU ranking predicts heteromorphemic metathesis

mappings	HOMLIN	*SON<C	LINEARITY
a. Basic segment order preserved /xed+va/ → xed-va ~ *xvd-a			W
b. Derived environment metathesis /xar+va/ → xvr-a ~ *xr-va		W	L
c. Blocking in monomorphemes /rgol+i/ → rgol-i ~ *grol-i	W	L	W

Can arguments be made that Tagalog *um*-infixation is similarly a derived environment effect? Not so transparently, but we will see that ultimately, yes, the same {HOMLIN >> M >> LINEARITY} ranking that holds in Georgian must hold as well in Tagalog. The applicability of the ranking is not entirely obvious inasmuch as no necessary ranking may be determined between HOMLIN and ONSET, the markedness constraint we have taken to be most integral to the workings of infixation in the language. As we see below, the avoidance of onsetless syllables in the language required a more nuanced ranking than that suggested by the MDEE ranking of ((55)a), and no crucial ranking between HOMLIN and the markedness constraint is observable.

(60) Allowing codas in non-derived forms

	/alsa/	HOMLIN	ONSET	DEP	LINEARITY
	alsa		*!		
☞	ʔalsa			*	
	lasa	*!			*

ONSET, however, is not the only markedness constraint crucial to Tagalog's infixational processes. Numerous authors (Orgun and Sprouse 1999, McCarthy 2002, Prince 2002) have observed the necessity of NOCODA in capturing the facts of infixation into complex onsets in the language. We explicitly eschewed such accounts in §2.3—this does not mean, however, that the ranking of NOCODA is completely irrelevant to the process. Strict adherence to RotB and contrasting facts of a related Austronesian language require us to consider the problem further. In Ilokano, two putatively VC affixes show distinct behaviors with identical bases of affixation.

(61) Ilokano (Vanoverburgh 1955, Zoll 1998)

Root	-um- *infixation*	-ag- *prefixation*
ʔisem	ʔumisem '(threatens to) smile.PRS'	ʔagisem '(actually) smile.PRS'
kagat	kumagat '(threatens to) bite.PRS'	ʔagkagat '(actually) bite.PRS'

Zoll (1998) points out that, if the two affixes are of the same prosodic shape (i.e., VC), no general ranking of a prosodic well-formedness constraint (like ONSET) and a generic constraint on morpheme position (alignment, in her theory, LINEARITY here) will produce the behaviors of both affix types simultaneously. To account for facts of Ilokano, Zoll resorts to morpheme-specific constraints of exactly the type we argued against in §1.

(62) Parochial alignment in Ilokano

{ALIGN-L-*ag* >> ONSET >> ALIGN-L-*um*} ⇒ ag-kagat, *k-ag-agat;
k-um-agat, *um-kagat

Note, however, that this account rests entirely on a similarity of prosodic structure between *ag* and *um*. A simpler way to capture this optionality is to posit different underlying structures for the two superficially similar morphemes, one with an initial glottal stop.

(63) Lexical representations of *um*, *ag*

"-um-" ⇔ /um-/
"ag-" ⇔ /ʔag-/

On the same basic ranking of constraints set out for Tagalog in Chapter One, these specifications of the morphemes will produce exactly the attested lexical variation.

(64) Lexical specification predicts varying behavior

mappings	ONSET	LINEARITY
a. /ʔag+kagat/ → ʔag-kagat ~ *k-ʔag-agat		W
b. /um+kagat/ → k-um-agat ~ *ʔ-um-kagat	W	L

This approach is desirable for a number of reasons. First, it does away with morpheme-specific alignment; in fact, it requires no indexation of constraints whatsoever. Second, it places the burden of explanation for an arbitrarily varying property of two different morphemes (i.e., one infixes, one doesn't) precisely where it belongs: in the lexicon. It is also interesting in as much as it requires us to consider more closely a larger contrast between Tagalog and Ilokano. There are no prefixes like *ag* in Tagalog—if a morpheme appears as ʔVC on the surface, it may only do so before a vowel-initial (surface [ʔV~] initial) root. As we can see, this fact lends itself to broader generalization and shows a systematic difference in the range of allowable morphophonological alternations in Tagalog and Ilokano.

(65) Contrasting generalizations

a. Tagalog
   All /ʔVC/ and /VC/ affixes infix after the first C of the root.
   (⇒ -um- infixes after the first C of the root.)

b. Ilokano
   Only /VC/ affixes infix after the first C of the root; /ʔVC/ affixes do not.
   (⇒ -um- infixes after the first C of the root; ʔag- does not.)

What are we to make of this fact? As the current approach explicitly follows RotB, we must take it that some fact of Tagalog's constraint ranking predicts this systematic variation between the two languages. Not only must it be the case that Tagalog's grammar forces the infixation if /um/: it must equally force dislocation of any *potential* prefixes of the form /ʔVC/.

Observe that our account of Tagalog predicts exactly the kind of lexical variation found in Ilokano if the Tagalog lexicon contains a morpheme of the form /ʔVC/. Consider a hypothetical morpheme /ʔum/, for example. Rather than the observed infixation, we predict simple prefixation.

(66) Incorrect prediction where actor focus = /ʔum/

/ʔum+sulat/ → s-■um-ulat	ONSET	MAX-C	NOCODA
a. ~ *ʔum-sulat		L	W
b. ~ *s-ʔum-ulat		L	

As should be apparent from the candidate space shown above, no ranking of ONSET—the constraint hitherto considered the *primum mobile* of the infixation process—can have any effect on the outcome of these comparisons, since all candidates, optimal or otherwise, satisfy the constraint equally. If we are respecting of RotB, then, some other constraint(s) must be at work to fully predict the *absence* of [ʔVC] prefixes in the language.

The solution to this dilemma falls out from a distributional asymmetry observable between glottal and place-bearing consonants. Carrier (1979) notes a number of conditioning environments for deletion of glottals (/ʔ/ and /h/) in Tagalog.

(67) Glottal deletion environments

a. Obligatory Deletion: {ʔ, h} → Ø / __ C
  - Word-finally before a consonant:
    cf. [ma-nabaʔ] 'it is long' vs. [ma-naba#ba] 'is it long?'
  - Under full reduplication:
    /na+RED+hiyaʔ/ → [na-hiya-hiyaʔ]
    /na+RED+mulah/ → [na-mula-mulah]

b. <u>Optional Deletion: {ʔ, h} → Ø / #__, V__V</u>
- ◇ Word-initially in casual speech: [(ʔ)alay] 'offering'
- ◇ Intervocalically in fast speech: [da(ʔ)op] 'join'

These facts show a systematic difference in the treatment of glottal- and place-bearing-C in Tagalog that we may account for with a glottal-sensitive formulation of a familiar faithfulness constraint, MAX-ʔ (Hayes and Abad 1989, Boersma and Hayes 2001), distinct from normal MAX-C, i.e,. the constraint mediating against deletion of place-bearing consoSnantism. When appropriately ranked below NOCODA,[29] we are thus able to predict the absence of /ʔVC/ prefixes in Tagalog, and the reverse in Ilokano, where both faithfulness constraints outrank the markedness constraint.

(68) MAX-C vs. MAX-ʔ

a. <u>Tagalog</u>

	/ʔum+sulat/	MAX-C	NOCODA	MAX-ʔ	LINEARITY
	a. ʔum-sulat		*!		
☞	b. s-■um-ulat			*	**
	c. ʔu■-sulat	*!			

b. <u>Ilokono</u>
If {MAX-C, MAX-ʔ >> NOCODA >> LINEARITY},
then /ʔag-kagat/ → ʔag-kagat, *k-ʔag-agat, *k-■ag-agat.

We see, then, the importance of NOCODA's ranking in the language's grammar, a well as its crucial ranking with respect to LINEARITY. In doing so, we come at last to the MDEE ranking necessary in the Tagalog grammar. The ranking of HOMLIN over NOCODA follows from an abundance of morpheme-internal codas elsewhere in the language. Were NOCODA not in an MDEE ranking with respect to HOMLIN and LINEARITY, it would be

[29] Note another distributional regularity of Tagalog: [ʔ] may appear in word-final codas, but never in medial codas. As the segment would be banned in *both* positions by the proposed {NOCODA >> MAX-ʔ}, we must conclude that some further investigation of these facts is needed to account for the distributional irregularity. As a stopgap, we might say that NOCODA here must be formulated as barring the release of one consonant into another, rather than barring all segments adjacent to a syllable boundary.

impossible to rule out the possibility of coda avoidance through metathesis in underived contexts, for example, in a morphologically simplex case /alsa/ → *ʔalsa*, **lasa* 'to rise'.

(69) Allowing codas in non-derived forms

	/alsa/	HOMLIN	NOCODA	LINEARITY
☞	ʔalsa		*	
	lasa	*!		*

This basic approach to morphological DEE will be considered in greater detail in Ch. 3, where we will consider in detail yet broader typological predictions of the HOM$\mathbb{F}_{rel}$ constraint formulation. We will show that a schema derived from the basic TETU ranking above, {HOM$\mathbb{F}_{rel}$ >> $\mathbb{M}$ >> $\mathbb{F}_{rel}$}, allows us to account for a considerable number of DEE's that have been presented in the literature.

3.2. Metathetic syncope

The alignment account, which attributes the behavior of the *-um-* infix to a morpheme-specific constraint, has no formal implications for other morpho-phonological phenomena of the Tagalog language one way or the other. The current approach, however, explicitly weds the two processes under the appellation 'dislocation' and the violational providence of LINEARITY. This would seem at first glance to pose a potential problem in Tagalog: the {HOMLIN >> LINEARITY} ranking predicts, all else being equal, a preference in the language for dislocation across morpheme boundaries, as opposed to dislocation within morphemes, and furthermore that both infixation and metathesis will follow this general tendency. As it happens, however, Tagalog shows a form of metathesis involving dislocation of homomorphemic segments in syncope environments. We will see in the discussion to follow that an account of this fact follows rather simply the multiply-violable nature of LINEARITY, however it is ranked in the grammar.

We will first consider the facts of consonant cluster metathesis in Tagalog, a phenomenon largely ignored in previous OT work, ignored primarily because a) it occurs in a fairly restricted morphological environment, and b) that environment only occurs optionally. The environment is that shown below. When members of a lexically idiosyncratic set of verbs undergo suffixation, word-medial syncope occurs. When certain consonants are brought into adjacency in the wake of syncope, metathesis ensues, but optionally. The following data are from Carrier (1979) and show both the syncopated/metathesized form of various roots, along with their non-syncopated variants.

(70) Tagalog Syncope + Metathesis (Carrier 1979)

a. Lateral + C: [lVC] ~ [Cl]

Root	*Non-syncopated form*	*Syncopated form*
ŋálan 'name'	paŋalán-an 'call.OBF'	paŋanl-án
kilálah 'acquaintance'	kilalán-in 'be acquainted with.OBF'	kilanl-ín
taláb 'effective'	talab-án 'take effect.OBF'	tabl-án
silíd 'enclosure'	sisilir-an 'fill a container.OBF'	sidl-án
súlid 'spin (cloth)'	sulír-an 'spin.OBF'	sudl-án

b. Rhotic + C: [ɾVC] ~ [Cd]

tiɾís 'squash'	tiɾis-án 'squash.OBF'	tisd-án
líɾip 'comprehend'	liɾíp-in 'comprehend.OBF'	lipd-ín

c. Other

ʔatíp 'thatch'	ʔatip-án 'thatch.OBF'	ʔapt-án

Based on the larger set of data found in Carrier (1979) and Schachter and Otanes (1972), we come to the following array of clusters banned under syncope and resolved by metathesis. Check marks (✓) show clusters forced to metathesize in the data, x-marked (×) cells denote those clusters allowed under syncope, and unmarked, grayed cells show clusters for which no data is available, one way or the other.

(71) Summary of Metathetic Environments

C_2 →

	p	b	t	d	k	g	s	m	n	ŋ	l	r	w	y	h	ʔ
C_1 ↓ l		✗	✓	✗		✓	✓		✗						✓	
d/ɾ	✗		✗				✗									
n			✓	✓				✗								
t	✗			✓							✓					

Taken in bulk and at face value, these results are somewhat confusing, and seem to ably support Carrier's conclusion that "it is not clear that economy is gained by handling the metathesis [cases] with a rule rather than simply listing them in their metathesized forms in the lexicon" (109). However, when we consider these facts in light of recent arguments made concerning both the functional and diachronic origins of metathesis along with examination of the available consonant clusters in the language generally, we see that a few deeper generalizations do shake out.

Blevins and Garrett (1998) observe that phonological metathesis processes (diachronic and synchronic) fall into one of four basic types, each correlate with a type of phonetic featural change. Two of those functional classes are of immediate relevance to the Tagalog case:

■ *Perceptual Metathesis.* Certain phonological features are known to have longer phonetic cues than others, that is to say, some features are longer in duration and more likely to show coarticulatory overlap on surrounding vowels and consonants. Features falling into this category include: rhoticity, laterality, palatalization, velarization, pharyngealization, aspiration, and nasalization. Metathesis involving a segment bearing such a feature is understood as diachronic reinterpretation of precedence relations in the phonological string brought about by simple confusion on the part of the language learner as to the ordering of the elongated feature with some surrounding segment.

■ *Coarticulatory Metathesis*. Both historically and synchronically, two of the most common forms of metathesis cross-linguistically involve stop-stop sequences: mappings PK→KP and T{KP}→{KP}T are found in a wide variety of the world's languages, both synchronically and diachronically. Blevins and Garrett take such mappings to be the result of diachronic reanalysis. Extreme coarticulation of the involved segments, like in all but place of articulation, leads to confusion on the part of the language learner, which in turn leads to cross-generational misrepresentation of the consonant sequence.

It is observable that both of these tendencies are abundantly apparent in the Tagalog metathetic syncope data, which break down into two types, those involving transposition of a phonetically long feature (laterality, rhoticity) or those characterized by transposition of a coronal-labial sequence. Or goal, however, is not to exhaustively account for the cause(s) of metathetic syncope in the language, as they are of a sufficiently varied (and possibly fossilized[30]) nature to defy a single consistent synchronic account. We will instead focus on one of the more explicable alternations—metathesis of *l* with a following voiced consonant—and demonstrate through it the availability of homomorphemic dislocation in the language.

Simply enough, homomorphemic metathesis may occur in the face of the {HOMLIN >> LINEARITY} ranking where a contextual markedness constraint barring liquid/voiced-consonant sequences is undominated. With tri-segmental consonant clusters ruled out by

[30] Based on my own fieldwork, at least the [rVC]~[Cd] alternations shown here are no longer productive (or even recognized) among younger speakers of Tagalog.

undominated constraints on the Tagalog syllable canon, satisfaction of such a constraint—call it *LC_{voi}—can be achieved heteromorphemically only through dislocation of an affix-final segment to the coda of the penultimate syllable, as shown in candidate (d) of Tableau (72) below. Such a candidate does not violate higher-ranked constraints in the language (abbreviated as 'SYNCOPE' below), and it performs just as well on HOMLIN as does the desired optimum (c), migration of the affix-final nasal to any root-internal position necessarily involving homomorphemic precedence reversal with respect to the affix vowel preceding it in the input. LINEARITY, ranked lowest, determines the winner: Interdigitation of the affix segments necessary to satisfy *LC_{voi} and undominated syllable structure constraints results in four reversals of input precedence.

(72) Homomorphemic metathesis

- *LC_{voi} := *[+lat][+voice, +anterior].
- 'SYNCOPE':= Canonical root shape ($\breve{\sigma}\bar{\sigma}$ or $\bar{\sigma}\bar{\sigma}$) is maintained in native vocabulary.[31]

	$/tal_1ab_2 + a_3n_4/$	'SYNCOPE'	*LC_{voi}	HOMLIN	LINEARITY
	a. $tal_1ab_2\text{-}a_3n_4$	*!			
	b. $tal_1b_2\text{-}a_3n_4$		*!		
☞	c. $tab_2l_1\text{-}a_3n_4$			*	*
	d. $ta\text{-}n_4\text{-}l_1\text{-}a_3\text{-}b_2$			*	****!

Effectively, then, homomorphemic dislocation occur in the language because there is no other dislocational repair that will involve fewer violations of HOMLIN and LINEARITY, regardless of their ranking. Not only is the heteromorphemic metathesis candidate (d) ruled out in the ranking, it is harmonically bounded by optimum (c) for the above set of constraints.

[31] More formally, we might accomplish this with the following ranking, {MAX-V_{loan}, ALLFTRT >> HIERAL >> MAX-V_{native}}, where foot alignment and a word-maximality condition HIER(archical)AL(ignment) (Ito et al. 1995, Itô et al. 1996, Ussishkin 2001) dominate faithfulness to vocalism (Max-V_{IO}). Truncation of a medial vowel will result to ensure that canonical stem shape is maintained. Forms which syncopate optionally are simply those lexical items in a state of transition between the native and loan strata, i.e., those index for either one on a per-speaker or per-dialect basis.

This conclusion provides some inroads to an apparent typological prediction of the theory not born out by known metathesis types. Since HOMLIN is a special version of LINEARITY, we appear to predict that, universally, there is no language in which metathesis occurs within morphemes despite the availability of dislocation across morpheme boundaries. All else being equal, heteromorphemic precedence loss is preferred on any ranking of the two constraints—i.e., for {*YZ >> HOMLIN, LINEARITY} the current theory predicts: /XY+Z/ → [XZ-Y], *[YX-Z]. Evidence to the contrary is found, however, in numerous cases. In the Biltine language Fur (Jakobi 1990), for example, only morpheme-*internal* precedence is lost to avoid an illicit onset cluster, not allowed word-initially: /k + b_1a_2/ → k-a_2b_1, *b_1a_2-k 'we drink'. However, as all the Fur examples cited by Jakobi involve prefixation of only a single-segment, it is observable (A. Prince *p.c.*) that a {LINEARITY >> HOMLIN} ranking would predict exactly the attested metathesis, since in all cases the numerically smallest amount of segmental material is being transposed, much as we expect when an alternation is controlled by multiply-violable LINEARITY. We see this result below, positing the relevant markedness constraint to be *CXONS.

(73) Fur Metathesis

	/k_1 + b_2a_3/	*CXONS	LINEARITY	HOMLIN
	a. k_1-b_2a_3	*!		
☞	b. k_1-a_3b_2		*	*
	c. b_2a_3-k_1		**!	

Thus it is apparent that, where some markedness constraint dominates {HOMLIN >> LINEARITY}, the ranking of those the constraints will not necessarily impose a preference for heteromorphemic precedence loss on the grammar. For a set of candidates equally violating HOMLIN, multiply violable LINEARITY always choses the optimum with the least amount of precedence reversal *in toto*.

3.3. Metathesis/infix variation

A more complicated case is found in the following alternations. In the goal-focus (GF) paradigm of Tagalog verbs (Schachter and Otanes 1972), an affix *in* shows the same infixational distributions of *um* before obstruent-initial bases.

(74) [+realis] morpheme *in*

/in+ʔalis/ → in-alis 'remove.RLS'
/in+basa/ → b-in-asa 'become-wet.RLS'

When the base of affixation begins with an approximant, however, the affix optionally avoids infixation altogether and metathesizes internally to *ni-*.

(75) Affixal metathesis

/in+ligaw/ → ni-ligaw, l-in-igaw, *lig-in-aw 'pay-court-to.RGF'
/in+linis/ → ni-linis, l-in-inis 'clean.GF'

These data again do not pose a serious threat to our theory of PoE, given an undominated markedness constraint appropriately formulated to capture the narrow phonological character of the alternation. We find such a constraint in the "generalized asymmetrical morphophonological avoidance constraints" of Klein (2002). Klein proposes that an effectively identical case of *VC/CV* affix infixation/metathesis in the related Austronesian language Chamorro results from high ranking of the following affix avoidance constraint, which penalizes any affix sonorant following a sonorant.

(76) *AFF(SON): Sonorant affix avoidance

*AFF([SON])/ #[SON]___
"An affix containing a sonorant is prohibited after a morpheme-initial sonorant."

With hyperinfixation of *-in-* to some position further down in the base string ruled out by LIN^2, and *AFF(SON) dominating HOMLIN, there is nothing for the affix to do except metathesize, regardless of the ranking of HOMLIN and LINEARITY.

(77) Homomorphemic metathesis

	$/i_1n_2+l_3igaw/$	LIN[2]	ONSET	*AFF/SON	HOMLIN	LINEARITY
	a. lig-in-aw	*!				
	b. i_1n_2-$l_3$igaw		*!			
	c. l_3-i_1n_2-igaw			*!		**!
☞	d. n_2i_1-$l_3$igaw				*	*

Throughout this effort, we have followed Orgun and Sprouse (1999) in their assumption that a simple OCP-style constraint on sequential labial onsets. While the constraint may have an *ad hoc* air about it, Plag (1998) discusses other cases of haplology resultant from identity in onset-onset sequences, for example English **femininize*, **minimumize*. A more general approach of the constraint might simply view it as the local conjunction (Smolensky 1995, 1997) of OCP(onset) and some more general constraint banning sonorant labials—(OCP(ons) $\&_{\text{Stem}}$ *SONLAB) perhaps. Such a formulation, and the basic constraint that it more rigorously codifies, would not be without objection, however. Klein (2002) takes exception to the OCP-type markedness constraint, observing a number of cases in which the string [mum] is attested in Tagalog.

(78) [mum] in Tagalog (Klein 2002)

a. Roots
mumoh 'particles of cooked rice'
mumo? 'ghost'
mumog 'gargle'

b. RED+Root
mag-mu-mumog 'gargling'

c. -um- before subsequent sonorant labials
s-um-umpah 'to promise'
?-um-uwi? 'go home' (Schachter & Otanes 1972: 293)
l-um-uwas 'go down-stream' (Bloomfield 1917: 397)

Klein argues that, given the ubiquity of the sound sequence in the language, identical onset avoidance must be limited to *um* infixed forms only, and furthermore, must be formulated by yet another avoidance constraint, shown below.

(79) *AFF([SON], [LAB])/[SON], [LAB]___ (Klein 2002)

"An affix containing a sonorant labial is prohibited after a sonorant labial."

Klein's constraint rightly captures the essential character of labial-avoidance in the language. However, as theories of contextual markedness go, Klein's constraint schema seems somewhat overpowered inasmuch as there is no sensible limit on what feature combinations must be avoided, and, perhaps more fatally, the theory is too narrow a proscription of the Tagalog word-formation space. The unfortunate fact is that this constraint should just as well cleave a wide swath of grammatically occurring forms from the Tagalog lexicon—those wherein the verbal prefix *ma-* occurs before a reduplicative copy of a labial-initial root (or alternatively, where the verbal or nominal prefixes *maŋ-* appear before a similar RED+ROOT combination and undergo nasal substitution). We see this in forms such as those below:

(80) Examples of AFF([SON], [LAB])/[SON], [LAB]___ in Tagalog[32]

/ma + RED + murah/ → mamumurah 'become expensive'
/maŋ + RED + putiʔ/ → mamumutiʔ 'become temporarily white'
/maŋ + RED + bilih/ → mamimilih 'shopper'

While Klein's overall arguments concerning the under-restrictive nature of OCP(um) are well taken, it remains to be seen what better theory might supplant both it and Klein's *over*-restrictive constraint. Given the trend towards indexation of faithfulness constraints we have accepted throughout this chapter, another approach might seek to limit the application of our OCP constraint with high-ranked faithfulness sensitive to the types of grammatical categories resistant to the markedness constraint.

(81) Indexed faithfulness constrains OCP

mappings	$\mathbb{F}_{ROOT}$	$\mathbb{F}_{BR}$	$\mathbb{F}_{ma}$	OCP	MPARSE
a. /mumoh/ → mumoh ~ *mumoh	W			L	
b. /RED+mugin/ → mu-mugin ~ *mugin		W		L	
c. /ma+murah/ → mamurah ~ *mag-murah			W	L	
d. /um+mahal/ → Ø ~ *mumahal				W	L

[32] Also found in more striking bad, but less lexically common forms such as: /ma + RED + mulmol/ → mamumulmol; /ma + RED + mulagat/ → mamumulagat.

Such an approach would observe a number of benefits over Klein's. In addition to allowing the full range of [mVm~] sequences in Tagalog, it makes use of faithfulness constraints already argued to exist in CON, and it makes use of a simple markedness constraint, OCP(ons) (or a conjunction of OCP(ons) and *SONLAB) already argued to exist in CON and to have observable influence in a range of haplological alternations. Unfortunately, however, it is far from apparent what constraint or set of constraints '𝔽' might be. Constraints of the MAX family couldn't work, since underparsing of *mahal* results in the same loss of root material that the high-ranked faithfulness constraint would have to rule out for *mumoh*. MPARSE itself, arguably conceivable as the sum of all MAX constraints, couldn't be so index for the same reason. One inroads to the problem might be observation of the fact that the vowel surfacing in [mum] is subject to co-articulatory nasalization with its bookend nasal labials. It is conceivable that this difference might be brought bear on the subject, where nasal co-articulated vowels are allowed to surface in root material, but not in affix material: [{mum}] ≻ Ø ≻ [{m-um}], domain of shared nasality shown curly brackets. This line of inquiry too proves fruitless, however, since the only form of faithfulness attendant to featural change, IDENT, would simply make no distinction between candidates with nasalized vowels and the null parse (which satisfies all IDENT constraints vacuously).

Regardless of these criticisms, it remains apparent that, where some markedness constraint dominates {HOMLIN >> LINEARITY}, the ranking of the two constraints need not rule out heteromorphemic precedence loss in a grammar.

3.4. Remarks on typological differences between metathesis and infixation

In spite of the formal ease with which metathesis and infixation are treated on a par, it must be duly noted that certain typological distinctions are observable between them, distinctions not captured by current phonological theory. We will here discuss these disparities and the formal problems they pose.

J. McCarthy (p.c.) observes that phonological metathesis, synchronically at least, does not permit migration of a segment more than one segment away from its base position—long distance metathesis is crosslinguistically very rare, if not universally disallowed.[33] In infixation, however, it is quite common for affixes to migrate any number of segments into a root; we will see numerous examples of such in the next chapter. It is important to consider the degree to which current phonological theory—especially that argued for here—accounts for this basic distinction.

Unfortunately, explanation of the disparity is wanting in current theory. A long-standing criticism of rule-based approaches to metathesis is that there is no non-stipulative way to constrain the space of possible metathesis rules. Any theory that allows rules like "123 → 213" can just well allow putatively impossible rules like "[<u>1</u>23…*n*] → [23…*n*<u>1</u>]" (LDM) and "[<u>12</u>345] → [34<u>12</u>5]" (interleaving). Lexical Phonology and Morphology (Kiparsky 1984, Mohanan 1986, Zec 1993) might capture the difference between infixation and metathesis by saying that rules of the former are exclusively lexical and rules of the latter exclusively postlexical. This wouldn't address the basic rule formulation problem inherited from rule-based formalisms, however. Do current OT

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[33] But see Garrett (xxxx) for examples of long distance metathesis occurring diachronically. It doesn't seem infeasible to me to suppose that there might have been some stage of for example Greek's evolution at which LDM occurred productively.

approaches fair any better? Unfortunately, no. Any theory which follows the 'string of pearls' model of segmental representation and posits LINEARITY (or align(morpheme)) to be a violable constraint can produce LDM and interleaving in factorial typology. This follows from the basic architecture of OT. Because a) GEN allows any possible rearrangement of segments in the string, b) domination is strict, and c) maximally endogenous markedness constraints don't care how strings are rearranged to avoid illicit sequences, there is currently no way to enforce locality bounds on segment 'movement' except with violable constraints (like ALIGN-BY-X, LINEARITY, and their respective variants). If the constraints that enforce locality are violable, non-local movement (in whole and part) is always possible in factorial typology.

We might approach the problem with a restriction on GEN. By and large, such restrictions are problematic because it is difficult to divorce a morphological constituent from the phonological matter of which it is composed. Any proscription on segmental dislocation strong enough to rule out LDM—an inviolable LIN^2, for instance—would just as well rule out 'non-local' infixation and edge-flipping morphology as in Huave and Afar. However, one might enforce something like a 'constituency condition' on allowable dislocations, in an attempt to circumvent this problem, effectively imposing a LIN^2 restriction that is blind to the movement of segments that exhaustively make-up a morpheme.

(82) Dislocation Constituency Condition

If $/\alpha<\beta/_{input} \rightarrow [\beta<\alpha]_{output}$, then:
a) α and β are single segments and $[\beta\frown\alpha]_{output}$; or
b) α or β is a contiguous morpheme.

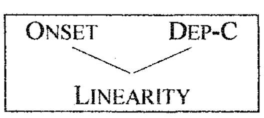
Thus morphemes may (in toto) dislocate over segments, syllables, feet, or words, and segments may dislocate over at most one other output-contiguous segment, but LDM and interleaving are prohibited. Such a prohibition would as well address a long-observed contradiction inherent to OT accounts of infixation. Infixational processes necessarily place affix contiguity at a higher premium than root contiguity, a fact directly contradictory to the Root-Faith/Affix-Faith meta-ranking proposed in M&P(1993). If GEN may only avail of local segment metathesis or dislocation of contiguous morphemes, the {CONTIG-Afx >> CONTIG-Rt} universal ranking proposed by Stemberger and Bernhardt may be abandoned in favor of the more robustly observable meta-ranking. Of course, as none of this derives from constraint interaction itself, but rather a blunt-force stipulation on GEN, all of this is really more a formal statement of the generalization, however, than an actual explanation of what's (not) occurring. A more refined understanding of this might come in the view that affixes are in some sense positionally equivalent to segments, inasmuch as they operate as discrete units with respect to segments of root morphemes.

Alternatively, one might argue, as does Yu (2003), that morphemes are unordered in the input and morpheme-alignment constraints universally dominate phonological constraints. This, coupled with something like an *inviolable* LIN[2], would allow the theory to position morphemes anywhere in the output string, but would force a locality condition on metathesis. At the same time, however, the theory be explicitly denying that prosodic morphology is property of natural language—infixation occurs in Tagalog because the right edge of [um] arbitrarily wants to be adjacent to the left edge of V_1, the end. It would also, as far as I can tell, either a) make metathesis at morpheme boundaries impossible, or b) predict interleaving, an equally unattested phenomenon, to occur in natural language. If morpheme alignment gradiently pushes every segment of a morpheme toward an edge and all morphological alignment constraints dominate all phonological markedness constraints (including the phonotactic constraints typically responsible for metathetic processes), then no phonological dislocation can ever occur. If, conversely, alignment is only categorically sensitive to edges of morphemes, as proposed by McCarthy (2003), nothing would prevent the phonology from, for example, taking every segment of a prefix but the initial one and interleaving them across the output word to satisfy phonological markedness conditions.

4. Conclusion

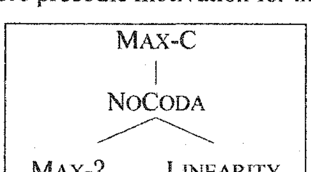
Before concluding, let us take a moment to review some of the findings of the chapter, as apparent in the proposed constraint rankings of Tagalog. In Chapter One, we proposed that a relational faithfulness constraint, LINEARITY, is crucially dominated in Tagalog, with the result being prosodically motivated infixation of underlyingly onsetless prefixes.

(83) The core ranking: M >> LINEARITY



In §3.1 we amended the basic account to accommodate potential variation in the input space, noting that NOCODA is in fact just as important to the workings of the alternation as ONSET is, given the distributions of glottal stop in the language.

(84) More prosodic motivation for infixation



Section 2.1 of this chapter went on to consider in more detail an observed problem in the Tagalog ranking. It was shown that ungrammatical hyperinfixation may occur where

conflicting markedness concerns dominate LINEARITY, and that some other piece of formal apparatus must be called upon to limit exponence position to a position local to the edge of input affixation. The apparatus called upon was simply a local self-conjunction of LINEARITY, and it was observed that an instantiation of the same constraint, LIN^2, can be called upon to rule out hypermetathesis as well, ruling out hyperdislocation across the board.

(85) Ruling out hyperinfixation

$$\begin{array}{ccc} \text{LIN}^2_{seg1} & & \text{OCP} \\ & \searrow\ \swarrow & \\ & \text{MPARSE} & \\ & | & \\ & \text{LINEARITY} & \end{array}$$

Some complication for this approach to hyperdislocation was found the behavior of certain Tagalog loanwords, wherein infixation may occur variably over either the first consonant of a word-initial cluster, or over the entire onset. Traditional accounts of this phenomenon have relied upon a tied ranking of *CXONS and NOCODA to account for this variation. Unfortunately, such a ranking cannot be at the heart of the Tagalog phenomenon, as root and loan vocabularies evince different behaviors in coda and complex onset realization. The fact that native-stratum DEP must be interposed between *CXONS and NOCODA to allow codas in native vocabulary effectively rules out the constraint tie account.

(86) Predicting the distributions of clusters in Tagalog loan phonology

$$\begin{array}{c} \text{DEP}_{\text{loan}} \\ | \\ \text{*CXONS} \\ | \\ \text{DEP}_{\text{native}} \\ | \\ \text{NOCODA} \end{array}$$

An optional complexity of subsegmental structure in that particular sub-stratum of the Tagalog lexicon provides an inroads to explanation of the phenomenon. As argued in §2.3, where LIN^2 and a faithfulness constraint to the aperture specifications of underlying forms dominate *CXSEG, underlying forms with complex segments may be realized as single output constituents over which *um* may infix without incurring violation of LIN^2.

(87) Free variation regained

$$\begin{array}{ccc} \text{IDENT(A)} & & \text{LIN}^2 \\ & \searrow \;\; \swarrow & \\ & \text{*CXSEG} & \\ & | & \\ & \text{DEP-V} & \\ & | & \\ & \text{NOCODA} & \end{array}$$

After considering a number of alignment-based approaches to the problem, we as well dispelled the notion that hyperinfixation must be universally prohibited, citing examples of mobile morphology and morphologically conditioned infixation as parallel cases suggestive of the possibility, if not the actuality.

We went on in the remainder of the chapter to consider various problems posed by high degree of metathesis/infixation interactivity necessitated by the theory. It was shown that some further mechanism was needed to rule out morpheme-internal precedence reversal, lest morpheme-internal metathesis alternate with infixation in a number of cases. This mechanism, *homomorphemic linearity*, was furthermore shown to provide an interesting in-road to morphological derived environment effects. With a special homomorphemic variant of LINEARITY ranked above both LINEARITY and DEP-C, we account for the observed resistance of metathesis in homomorphemic sequences and as well rule out onsetless syllables in Tagalog.

(88) Allowing codas in non-derived forms

ONSET HOMLIN

DEP-C

LINEARITY

At the same time, we saw that the very morpheme internal metathesis ruled out in *um* marked forms does occur under narrowly proscribed conditions in another verbal paradigm in the language. The alternation was shown to follow from the high-ranking of an 'affix avoidance constraint' proposed by Klein (2002).

(89) Morpheme internal metathsis in *-in-*

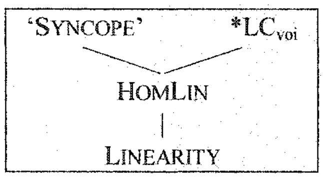
LIN$^{2}_{seg1}$ ONSET *AFF/SON

HOMLIN

LINEARITY

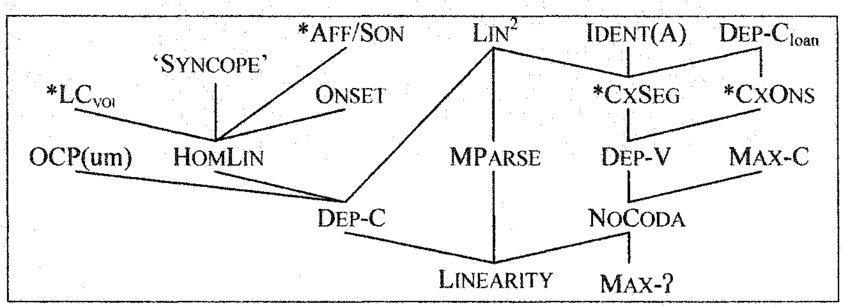
In §3.2, we saw that metathesis, when conditioned by an appropriately narrow set of markedness constraints, may occur in an across-the-board fashion, despite an apparent trend toward heteromorphemic precedence loss implied by the special/general nature of HOMLIN and LINEARITY in OT grammars. Where constraints conditioning syncope, together with an undominated constraint on the co-occurrence of lateral-consonant sequences, dominate HOMLIN, metathesis will be constrained to LC sequences, regardless of where they occur in the input string.

(90) Homomorphemic metathesis



These various rankings aggregate to the following grammar in dislocational processes in Tagalog.

(91) Final Tagalog Ranking



In sum, the chapter accounted for an apparent shortcoming in traditional accounts of prosodic infixation—the possibility of hyperdislocation in particular grammars—without recourse to parochial alignment constraints or any post-phonological component of grammar necessary to render a potential output absolutely ungrammatical.

Infixation does not only occur for prosodic reasons, however. In the Leti, Cupeno, and Ulwa cases we observed in §1, infixation occurs to no immediately observable gain in terms of prosodic or phonological well-formedness.

(92) Aprosodic infixation

a. <u>Leti Nominalization (Van Engelenhoven 1995, Blevins 1999)</u>
/ni+kaati/ → k-ni-aati 'carving'
/ni+atu/ → ni-atu 'knowledge'

b. <u>Cupeno Habilitative Formation (Hill 1970, Broselow and McCarthy 1983, Crowhurst 1994, McCarthy 1997)</u>
/čál+RED/ → čá<u>ʔaʔa</u>l 'husk.HAB'
/páčik+RED/ → páči<u>ʔi</u>k 'leach.acorns.HAB'

c. <u>Ulwa Construct Infixation (McCarthy and Prince 1993)</u>
/bas+ka/ → bas-ka 'hair.POSS'
/siwanak+ka/ → siwa-ka-nak 'root.POSS'

We will argue in the next chapter that such phenomena are the result of what may be loosely termed 'analogical' forces in each language's respective grammar—high-ranked O-O faithfulness constraints preserving the output positioning of high-salience categories across morphologically related output forms. Where dislocation occurs in natural language, a LINEARITY constraint must be crucially dominated. There are two broad categories of constraints that can force dislocation, markedness—as we have seen repeated in this chapter—and, as it turns out, faithfulness. One might suppose that, since faithfulness only preserves structure, no such constraint could force a violation of LINEARITY. Where said faithfulness and LINEARITY are composed over the same dimension of faithfulness, this is true; where this other faith and LINEARITY preserve structures of non-identical strings, however, one may force violation of the other. This, as we will see, is exactly the kind of interaction needed to account for aprosodic dislocation. Infixation, broadly speaking, results from one of two basic types of constraint ranking, schematized below.

(93) Dislocation in OT

a. Prosodic/Phonological Dislocation: {$\mathbb{M}$ >> LINEARITY$_{IO}$}
b. Analogical Dislocation: {$\mathbb{F}_{OO}$ >> LINEARITY$_{IO}$}

Having explored some of the complications arising for a theory of PoE from the rankings of (a) above, we will move on to (b) in the next chapter.

Chapter Three – Aprosodic Infixation and Typology

The Edge...There is no honest way to explain it because the only people who really know where it is are the ones who have gone over.

– Hunter S. Thompson, *Hells Angels: A Strange and Terrible Saga*

1. $\mathbb{F}_{rel}$ and Aprosodic Infixation

McCarthy and Prince (1993a) observe an important typological fact: infixation is not always prosodically conditioned. In fact, as pointed out by Blevins (1999), infixation may result in a structure more marked than simple pre-/suffixation. Yu (2003) takes these facts as evidence against the basic dislocational approach to infixation employed in McCarthy and Prince (1993)—and by extension in the last chapter—arguing that, if infixation is characterized by a drive to produce less marked structure, a number of attested examples of -C- and -CV- infixation such as those found below should never occur.

(1) Infixation over initial σ in Katu (Costello 1998)

a. C-initial roots: σ_1 infixation

verb	*noun*	
katas	ka-r-tas	'name.inf/name.n'
saveeng	sa-r-veeng	'be.between.inf/place.between.n'

b. V-initial roots: σ_1 infixation

achia	a-r-chia	'advise.inf/things.given.n'
aloom	a-r-loom	'offer.gift.inf/gift.offered.n'

(2) Infixation over initial C in Leti (Blevins 1999)

a. C-initial roots: Single-C infixation

verb	*noun*	
kaati	k-ni-aati	'carve.inf/carving'
polu	p-ni-olu	'call.inf/act.of.calling'

b. V-initial roots: Prefixation

osri	ni-osri	'hunt.inf/hunting'
otlu	ni-otlu	'push.inf/pushing'

In the Katu examples, a single-C infix is positioned immediately after the first syllable of the root, regardless of the prosodic shape of that syllable, [V~ or [CV~. This positioning obviously had nothing to do with the low-level prosodic well-formedness imperatives of the kind that motivate Tagalog infixation. Similarly, the Leti examples dramatically show a kind of infixation which produces, from the standpoint of syllable structure at least, a remarkably marked output form. We will take both cases to be exemplars of aprosodic infixation, infixation non-derivable from a {M >> LINEARITY} constraint ranking.

Such cases have been accounted for with *prosodic subcategorization* constraints, constraints which enforce the adjacency of morphological constituents with the outside edges of various types of prosodic categories (Broselow and McCarthy 1983, Inkelas 1989, McCarthy and Prince 1993b, Yu 2003). Examples of such constraints which might be relevant to the Katu and Leti examples are as shown below.[34]

(3) Prosodic Subcategorization Constraints

Leti: AFFIX-TO-INITIAL-C := ALIGN(ni_{nom}, L, C_1, R)
Katu: AFFIX-TO-INITIAL-σ := ALIGN(r_{nom}, L, σ_1, R)

The present account expressly eschews such constraints for all the same reasons that we argued against any form of parochial alignment in §1—a proliferation of such constraints will ultimately lead to morphological over-generation and degradation of universals of morphosyntax. We are thus presented with a singular dilemma: a morpheme migrates away from its default morphological position to satisfy some apparently non-phonological imperative. In the absence of alignment, what can this imperative be? Assuming that simple concatenation is the only mechanism available to the morphosyntax (as argued by Halle and Marantz 1993), LINEARITY will force gravitation

[34] These constraints are nominally distinct from those argued for by McCarthy and Prince (1993), Broselow (1983), and Inkelas (1989) inasmuch as they align MCats to *string-initial* PCats, rather than *prosodic-head* PCats. The basic mechanism, however, alignment of opposite edges of M/PCats, however, remains the same.

of a morpheme to its pre-/suffixal orientation only. Where no phonological conditioning factors overrule LINEARITY, infixation should not occur.

We will respond to this apparent dilemma by observing the fact that, though *some* cases of infixation are best analyzed as resultant from the interaction of prosodic well-formedness constraints and constraints on morpheme position, i.e., faithfulness constraints, nothing entails that *all* cases of infixation must result from the same schematic ranking. This follows rather obviously from the fact that prosodic well-formedness constraints are not the *only* constraints in a grammar which may conflict with constraints on morphological realization. In fact, as we will demonstrate in sections to follow, constraints on morphological realization may compete with each other: a conspiracy of faithfulness constraints of the ANCHOR(ing) and CONTIG(uity) variety may crucially conflict with LINEARITY to produce aprosodic affixation through the preservation of high-salience, edge-bound prosodic categories. We will further show that these constraints must be specified over the O-O correspondence relation and that cases of infixation such as those found in Katu and Leti must ultimately fall out from constraint rankings derived from the following schema, which we dub 'analogical infixation'.

(4) Analogical Infixation: {$\mathbb{F}_{OO}$ >> LINEARITY}

This approach is entirely consistent with various functional accounts of infixation as a historical process. High-salience prosodic and segmental categories are resistant to the kinds of phonetically reductive processes that should result in infixation diachronically; thus the total identity of some high-salience constituent in a derived word should, hypothetically, strengthen analogical cohesion between base and derivative. These notions translate directly into OT, where analogical relations between morphologically related words are captured with OO-faith, and phonetically-governed reductive pressures are the domain of markedness.

1.1. O-O Anchoring

Let us consider in closer detail the workings of the theory in the above case of infixation found in the Austronesian language Leti (Van Engelenhoven 1995, Blevins 1999). The Leti case presents the most remarkable example of infixation which occurs to produce *marked* syllable structure, and as well shows a considerable array of phonologically conditioned allomorphy.[35]

(5) Leti Nominalization

a.	Single-C Infixation		
	allomorph	*3sg verb*	*nominal*
	-ni-	n-kaati 'to carve'	k-ni-aati 'carving'
	-n-	n-kini 'to kiss'	k-n-ini 'kissing'
	-i-	n-mai 'to come'	m-i-ai 'arrival'
b.	Prefixation		
	ni-	n-atu 'to know'	ni-atu 'knowledge'

The crucial generalization upon which our larger theory of aprosodic infixation will hang is simply that, in all cases of infixation, the resulting word is structurally identical to its derivational base at the left periphery. We will argue here that the conditioning force behind this fact is an OO-Faithfulness constraint (Burzio 1995, Kenstowicz 1995, Benua 1998) preserving the adjacency relation between the stem-initial consonant of the output base and the left stem edge (see Bakovic (2000) for arguments regarding the use of output *stems* as OO-bases, rather than entire words). We will formulate this morphological imperative in accord with the constraint schema of McCarthy and Prince (1999).

[35] A number of additional allomorphs arise in a distinct, lexically determined class of deverbals; see Blevins (1999) for further discussion.

(6) L-ANCHOR-$seg_{S1\text{-}S2}$

Let *Edge*(Σ, L) = the segment standing at the left edge of Σ.
If x = *Edge*(S_1, L) and y = *Edge*(S_2, L) then $x\Re y$.

Note that constraints of the anchoring variety *are* relational faithfulness constraints, given the formal status of *edge* in the current theory. Following McCarthy and Prince (McCarthy and Prince 1993b), we take the intuitive notion *edge* in a string to be any empty element *e* in a concatenative decomposition of string elements. String element *e* is positionally indexical, just like a segment, and may participate in all the standard structural relations available to segments, including *adjacency*. In the constraint definition above, 'the consonant standing at the left edge of Σ' must be understood as that consonant left-adjacent to the string-initial empty element e_1. It is apparent then that the above constraint is simply preserving an input adjacency relation, much like the more general adjacency faithfulness constraint, CONTIG. Left anchoring states, in effect, that the output correspondent of any segment contiguous with string initial *e* in S_1 must be likewise contiguous with *e* in S_2. Note also that we will assume the above constraint to be a positional variant of a more general constraint preserving edge-adjacency of any edge-bound segment; we thus follow Nelson (Nelson 1998, 2003) in avoiding a number of the typologically calamitous predictions of a theory of CON containing a parallel constraint R-ANCHOR.

As tableau (7) below shows, where LINEARITY is dominated by L-ANCHOR_{OO}, Single-C infixation must occur in the derived word. The affix advances no farther into the root morpheme than a single C to avoid greater violation of LINEARITY.

(7) {L-ANCHOR$_{OO}$ >> LINEARITY} ⇒ Single-C Infixation

	/ni + kaati/	L-ANCHOR$_{OO}$ [kaa.ti]	LINEARITY
☞	a. k-ni-aati		*
	b. ni-kaati	*!	
	c. kaa-ni-ti		**!*

Our decision to use O-O faithfulness here, rather than I-O, is not a trivial one. The account proposed here is similar in most respects to the account of Maŋarayi infixal reduplication offered by Kurisu and Sanders (1999).[36] They cite a reduplicative example from Maŋarayi wherein the initial rhyme (and possibly following onset) of a root is copied into a single-C infixal reduplicant: /guɽjag/ → [g-uɽj-uɽjag] 'having lots of lilies'. L-ANCHOR$_{IO}$, on their account, mandates the preservation of the initial segment's edge-adjacency in the output string.

(8) L-ANCHOR-C$_{IO}$ inhibits prefixation; /guɽjag/ → g-u̲ɽ̲j̲-uɽjag (Kurisu and Sanders 1999)

	/guɽjag, RED/	L-ANCHOR$_{IO}$	ALIGN-L(RED, PrWd)
☞	a. g-u̲ɽ̲j̲-uɽjag		*
	b. gu̲ɽ̲-gu̲ɽ̲-jag		**!*
	c. gu̲ɽ̲-guɽjag	*!	

A crucial assumption about the nature of input representations prevents ANCHOR$_{IO}$ from correctly predicting Single-C infixation more generally, however. In the Maŋarayi case, Kurisu and Sanders assume no input adjacency or precedence between the reduplicant and the root—despite the reduplicant's essentially prefixal orientation—and so *guɽjag* is effectively at the left edge of the input string. The {*e*~g} adjacency relation may thus be maintained in the output by anchoring.

[36] Note that Kurisu and Sanders' approach to Maŋarayi—and the account of Leti proposed here—are conceptual descendents of an alignment-based approach to the problem originally proposed by McCarthy and Prince (1993), who argue the Maŋarayi facts to fall out from competition of alignemtn constraints: ROOT-ALIGN, which requires some segmentism of the root to be initial in the output string, and LEFTMOSTNESS, a 'prefix' constraint of the familiar variety—ALIGN-L(RED, Prwd). Where {ROOT-ALIGN >> LEFTMOSTNESS}, exactly the attested infixation is predicted to occur.

In cases of aprosodic infixation, it is crucial to assume that inputs are rich in precedence and adjacency relationships; that is, for any two elements of the input, *x* and *y*, *x* does/does not precede *y*, and *x* is/is not adjacent to *y*. In the Leti case, for instance, we must assume that *ni* is input-prefixal and thus ordered before the root *kaati* As figure ((9)a) below shows, this effectively means that the root-initial segment is no longer string-initial in the input.

(9) Adjacency relations of Root C1

a. input string: $/n_1 i_2\text{-}\boxed{k_3}a_4 ati/$, $\{\# \nsim k\}$

b. output string: $[\boxed{k_1}\text{-}n_2 i_3\text{-}a_4 ati]$, $\{\# \frown k\}$

c. output base string: $[\boxed{k_1}a_2 ati]$, $\{\# \frown k\}$

Only by anchoring the first segment of the OO-Base do we drive the root-initial segment to the left edge of the affixed word. Another possibility might be to posit an I-O constraint that anchors a root-initial segment in the input to the left periphery of the output prosodic word. This seems somewhat artificial, however, and misses the fundamentally *morphological* character of the affixation process—the use of general ANCHOR_{IO} suggests that every morpheme in the language should be equally subject to the constraint, and the most cursory perusal of Van Engelenhoven's Leti grammar shows that this is not the case. We will furthermore take it as a positive result that this fact is explained by standard assumptions of Transderivational Faithfulness Theory (Benua 1998), wherein the affix *ni* may lexically select for the correspondence relation over which the anchoring constraint holds, in this case the correspondence relation between the nominalized form and the stem of the third-person singular form.

(10) Correspondence relations in the Nominal paradigm

$$\begin{array}{lll} /n + kaati/ & \rightarrow_{IO} & n\text{-}\{kaati\} \\ & & \downarrow_{\text{OO: Verb Stem – Nominal}} \\ /ni + kaati/ & \rightarrow_{IO} & k\text{-}ni\text{-}aati \end{array}$$

A basic understanding of the infixation now in hand, we may attend tangentially to the various other instances of phonological allomorphy found in the paradigm. Consider first the fact that infixation does not occur in vowel-initial forms. This fact shows a crucial interaction between anchoring and prosodic well-formedness constraints in the grammar, as infixation of *ni* over the root-initial vowel is blocked to avoid violation of high-ranked ONSET and DEP. Van Engelenhoven (1995) observes that all vowel initial words in Leti are pre-glottalized; this follows from a straightforward OT account in which {ONSET >> DEP}. Where both constraints dominate L-ANCHOR, as shown below, infixation is ruled out.

(11) No infixation over V; /ni + osri/ → ni-o.sri

	/ni +osri/	ONSET	DEP	L-ANCHOR$_{OO}$ [os.ri]
☞	a. ni-o.sri			*
	b. o.-ni-s.ri	*!		
	c. ʔo.-ni-s.ri		*!	

The infixal *-n-* allomorph too falls out from fairly standard constraint interaction. Where an anti-hiatal constraint barring adjacent high-vowels (OCP-high, below[37]) is flanked by MAX-RT and MAX, truncation of the affix vowel will arise to avoid *ii* or *iu* sequences.

(12) Deletion of i; /ni + kini/ → k-n▪-ini

	/ni + kini/	MAX-RT$_{IO}$	OCP-high	MAX$_{IO}$
☞	a. k-n▪-ini			*
	b. k-ni-▪ni	*!		*
	c. k-ni-ini		*!	

Similarly, the emergence of the *-i-* allomorph, results from both a prohibition on coronal-coronal clusters[38] (mapping (a) below) and an emergence of the unmarked effect, deriving from a ranking of OCP-nas between root and general MAX (mapping (b)). The ranking on MAX-RT with respect to the OCP constraints is justified by the lack of nasal-

[37] OCP-high ≡ {*[+high] ∧ *[+high]}$_{AdjSeg}$.
[38] OCP-cor ≡ {*[+cor] ∧ *[+cor]}$_{AdjSeg}$.

cluster reduction in underived contexts, (c), and a lack of [cor]͡[cor] clusters anywhere in the language, (d).

(13) Deletion of [n] after a nasal or coronal

mappings	OCP-cor	MAX-RT$_{IO}$	OCP-nas	MAX$_{IO}$
a. /ni + davra/ → d-▪i-avra ~ *d-ni-avra	W			L
b. /ni + mai/ → m-▪i-ai ~ *m-ni-ai			W	L
c. /mnina/ → mnina ~ *m▪ina		W	L	W
d. /…dn…/ → […d▪…] ~ *[…dn…]	W	L		

The effects of these dissimilatory constraints are so pronounced in the nominal that complete truncation of the affix may arise in the event of concatenation to a root beginning with both a coronal consonant and a high vowel, as seen in the following forms.

(14) Zero-affixation

/ni + ruru/ → ruru 'trembling'
/ni + divri/ → divri 'smashing'

Here any realization of the affix in the output would violate (at least) one of the markedness constraints, as seen in the following tableau.

(15) Zero-affixation; /ni + ruru/ → ▪▪-ruru

	/ni + ruru/	OCP-cor	OCP-high	MAX$_{IO}$
☞	a. ▪▪-ruru			**
	b. r-ni-uru	*	*	
	c. r-n▪-uru	*		*
	d. r-▪i-uru		*	*

To summarize, there are two sets of crucial rankings which drive the Leti allomorphy. The basic infixation facts are derived from the anticipated ranking of $\mathbb{F}_{OO}$ over LINEARITY—in this case, L-ANCHOR-C$_{OO}$. This hierarchy in turn is dominated by the language-wide glottal-epenthesis ranking, {ONSET >> DEP}, which acts in this case to *block* the effects of L-ANCHOR, forcing input prefix *ni-* to remain a prefix in the output to avoid emergence of marked structure and/or its epenthesis repair. Concomitant to these rankings are normal phonotactic constraints on adjacency of featurally identical segments. Coronal/coronal sequences are ruled out across the board in the language, preventing surface forms such as **d-ni-avra*; adjacent high vowels and adjacent nasals are likewise prohibited from occurrence in the infixed forms, with an end result of deletion of affix material (in whole or part) to produce a most-harmonic output.

(16) Ranking summary, Leti

a.

ONSET
|
DEP
|
L-ANCHOR$_{OO}$
|
LINEARITY

b.

OCP-cor
|
MAX-RT
OCP-high   OCP-nas
MAX

These relatively minor details made clear, we may conclude our discussion of Leti with a brief comparison of the current theory with that which it is designed to replace: parochial alignment. There are a number of means by which alignment constraints could be used to account for facts such as these, and we will make such criticisms of each as we may, independent of §1's general arguments against parochial alignment.

First, a fairly simple, output-oriented constraint aligning the left edge of the root with the right edge of the prosodic word would perform a function similar to that of L-ANCHOR in the above analysis.

(17) {ALIGN(Root, L, Prwd, L) >> LINEARITY} ⇒ aprosodic affixation

Numerous accounts of aprosodic infixation have relied upon such a constraint and achieved similar results (McCarthy and Prince 1993a, Stemberger and Bernhardt 1998). Such approaches (intentionally or otherwise) make an appeal to functional notions of *root access*. Hawkins and Cutler (1988) have argued convincingly that the preference for suffixal morphology over prefixal in the world's morphological systems derives from a computational concern: the sooner a root is pronounced in the surface word, the faster lexical access will occur. Our principal criticism of this line of function-inspired analysis is simply that it makes no sense of a certain parallel found in infixation typology (to be discussed at greater length in §2). While the bulk of the world's infixation processes are prefixal in nature—that is, as in Tagalog and Leti, they alternate with a prefix or occur near to the left edge of the morphological word—it happens that aprosodic infixation of the type discussed does occur at the *right* periphery of the morphological word (as, for example, in diminutive infixation in the Interior Salish language Colville (Mattina 1973, Yu 2003). An account appealing to root access for its functional underpinnings has no explanation for this fact; an alignment constraint propelling the root rightward in the prosodic or morphological word runs entirely counter to the allusion. On the proposed account, however, root access—while possibly a genuine consideration in recognition grammars (Boersma 1998)—need play no role in the motivation of aprosodic infixation. Rather, infixation is conditioned by phonological similarity between semantically related surface forms, and the right periphery of the word, while not so salient as the left, is still of sufficient phonological salience to be commended as a target of surface-to-surface faithfulness.

We have already made mention of a second approach to aprosodic infixation: prosodic subcategorization, as in (3) above. While the Leti case provides little concrete evidence for or against prosodic subcategorization, we will note that the alignment constraint such as 'ALIGN(affix, L, C_1, R)' is really little more than a descriptive statement of the Leti infixation pattern. As we consider various implementations of the current theory with respect to several attested types of aprosodic infixation in sections to come, we will see that prosodic subcategorization is in most cases our chief theoretical rival. More damning criticism of that approach will be made on an as-relevant basis.

1.2. Domain-Contiguity

A more complex case is found in Katu, where infixation of a nominalizing morpheme *-r-* is found uniformly over not just a single segment, but rather the initial syllable of the root. The anchoring approach used to account for the facts of Leti is not sufficient in the Katu case. As is apparent in the tableau below, anchoring can't cause infixation over more than a single edge-bound segment. Neither can we resort to some phonotactic condition (or combination thereof) to account for the pattern. Costello et al. (1998) report that stop-liquid clusters occur regularly throughout the language, as seen in such examples as [krat] 'to close up', [p^hruŋ] 'to flee', and [tro] 'to demand, scold'.

(18) Failure of σ-infixation

	mappings	L-ANCHOR$_{OO}$ {[a.loom], [ka.tas]}	LINEARITY
c.	/r + aloom/ → a-r-.loom ~ *r-a.loom	W	L
d.	/r + katas/ → ka-r-tas ~ *k-r-atas		L

A solution to this apparent dilemma is found in observation of the following fact: in each case of infixation-over-σ, the contiguity relations within the first σ of the infixed word and its derivational base remain intact.

(19) Syllable preservation across related forms: $[_\sigma(\underline{ka})tas]_{verb} \Rightarrow_{\Re} [_\sigma(\underline{ka}\text{-r-})tas]_{nominal}$

A formalization of this generalization requires one or more constraints in the grammar that can effectively anchor *all* of the first syllable of the output base with respect to the left edge; the initial segment of the root must be contiguous to the string edge, and successive segments with correspondents in the first σ of the OO-base must be successively contiguous in turn. As we will see in following discussion, we may achieve this effect through the use of anchoring constraints and domain-contiguity constraints of the type discussed in (Lamontagne 1996, Alber 2001). Consider the following constraint schema, modeled after the CONTIG constraint of (McCarthy and Prince 1995).

(20) CONTIG-*PCat*

The portion of S_1 standing in correspondence forms a contiguous string in S_2.
Domain($\Re$) is a single contiguous string in every *PCat* of S_1; *PCat* $\in \{\mu, \sigma, \text{Ft}\}$.

When relativized to the prosodic category *syllable* and specified over an O-O correspondence relation, such a constraint would effectively prevent any addition or deletion of material within strings corresponding to syllable-contiguous segments in an OO-base. Where anchoring of the left edge with respect to the same OO-base mandates that first segment of the root be initial in the output string, the initial σ is proscribed as a domain of prosodic invariance across two morphologically related words. We can readily discern the utility of such machinations in the Katu case.

(21) Immobile infixation over σ

	/r + katas/	L-ANCHOR$_{OO}$ [ka.tas]	CONTIG-σ_{OO} [ka.tas]	LINEARITY
☞	a. ka-r-tas			**
	b. r-katas	*!		
	c. k-r-atas		*!	*

Lamontagne (1996) argues independently for the necessity of I-O domain-contiguity constraints, observing the behaviors of languages such as Diegueño (Langdon 1970), which allow epenthesis between heterosyllabic consonants, but not between consonants belonging to the same syllable. As we see in the following data, where a concatenation of single-C morphemes in the input demands some output repair to satisfy an undominated constraint on surface consonant clusters (i.e., *CXONS), two default vowels are epenthesized.

(22) Diegueño epenthesis

/s-k-wank/ → sə.kə.wank, *sək.wank 'to turn wrong side out'
/t-p-k^wir/ → tə.pə.k^wir, *təp.k^wir 'to wind'

This is an odd occurrence, especially since CVC syllables are found throughout the language's syllable canon. Since syllable well-formedness conditions (i.e, NOCODA) thus cannot come into play to allow the extra epenthetic syllable, some constraint must dominate DEP-V_{IO} to ensure that failed candidates such as *[təp.k^wir] do not surface. Lamontagne argues this to be the result of an undominated CONTIG-σ_{IO}. In the optimal candidate [tə.pə.k^wir], *t* and *p* are heterosyllabic, and so insertion of an epenthetic vowel between them cannot result in a CONTIG-σ violation. In *[təp.k^wir], however, syllabification of the two consonants together results in violation of the contiguity constraint: by dint of their homosyllabicity, greater demands are placed on the retention of underlying structural adjacency between the segments, and epenthesis is marked.

Note, however, that I-O domain-contiguity cannot be at work in Katu nominalization. McCarthy and Prince's original formulation of CONTIG provisioned for maintenance of adjacency with respect to either S1 or S2. That is, I(nput)-CONTIG requires adjacency relations in S1 to be preserved in S2, and O(utput)-CONTIG v.v. Lamontagne's constraint is crucially of the O-CONTIG variety—there is by hypothesis no syllable structure in the input or at least, in accordance with RotB, no constraint which refers to it. As closer consideration of the Katu phenomenon demonstrates, O-CONTIG-σ_{IO} fails to distinguish between two crucial competitors.

(23) Incorrect results: O-CONTIG$_{IO}$

	/r + katas/	O-CONTIG-σ_{IO}	LINEARITY
	a. .ka-r-.tas.	* {r⌢a}	**!
☛	b. .k-r-a.tas.	* {r⌢a}	*

For a (here ungrammatical) candidate *k-r-atas*, O-CONTIG is violated once; of the precedence relations in the first σ of the output, {k⌢r, r⌢a}, one, {r⌢a}, is not present in the input. Because CONTIG doesn't distinguish segment *edges*, input /r + k~/ is, in terms of adjacency, equivalent to output [k-r-~]. The problem arises from the fact that the desired optimum, *ka-r-tas*, presents the same single CONTIG violation, {r⌢a}, allowing lower-ranked LINEARITY to choose between the two candidates. This problem does not, of course, arise if we stick to the analogical infixation theme: I-CONTIG$_{OO}$ is violated only by the *breaking* of the first σ of the output-base, *ka*. The affixation of a segment to the outer edges of a contiguous syllable, as in the desired optimum, does not result in violation.

We thus capture the surface patterning of 'over-σ' infixation with a species of relational faithfulness constraint elsewhere mandated in the CON, and—more importantly—we do so without any dependence on morpheme-specific alignment constraints. Together with constraints of the anchoring variety, we now have a theory of aprosodic infixation which makes certain predictions about the range of possible infixation patterns occurring without otherwise observable phonological impetus. As is apparent in the following schematic, we explicitly predict that a typology of infixation types should attest infixation over—to borrow from the descriptive terminology of an earlier approach to such phenomena—a *kernel* of infixation potentially comprising any edge-bound segment or prosodic category. The schematic shows infixation at a left string-edge, but note that, given the our characterization of generic ANCHOR as holding over left and right edge-adjacent segments equally, the theory predicts the full range of mirror-image cases at the right boundary.

(24) Available kernels of infixation

ANCHOR-*seg*	CONTIG-{σ, Ft}
LINEARITY	

$$\Rightarrow \quad {}_{\text{edge}}[\left\{\begin{matrix} seg \\ \left\{\begin{matrix} \sigma \\ Ft \end{matrix}\right\} \end{matrix}\right\}\text{-infix-}\ldots]$$

As we will see in the next section, this collective body of predictions is in fact borne out in the attested typology of known infixation types.

2. Infixation Typology

The basic modification to the traditional (i.e., alignment-based) theory of PoE in OT now established, we're in a position to consider its larger consequences of the theory against the typology of known infixation types. Moravcsik (2000) give the following patterns of attested infixation from a sample of some 33 languages (Ultan 1975). Moravcsik observes that the prefixally-oriented patterns (a-e) outnumber the suffixally-oriented in frequency as well as type.

(25) Attested infixation sites

a. after the first consonant
b. after the first consonant or consonant cluster
c. after the first vowel
d. after the first syllable
e. after the second consonant (i.e. second triliteral)
f. after the vowel of the penultimate syllable
g. before the final syllable
h. before the final consonant

The first cases, (a-b), are by now of a very familiar variety to us, describing the facts of Tagalog (b) and a variety of other Austronesian languages with "over-initial-C" infixation. Patterns (d) and (g-h) are similarly familiar to us: (d) is a simpler analogue of the Katu case analyzed above; (g) and (h) are simply the mirror-image alternations of over-σ and over-C infixation found in Leti and Katu. In patterns (c), (e), and (f), however, we see infixation loci in natural language that are not immediately suggested by the workings of the current theory: after the first vowel, after the second consonant, and after the first vowel of the penultimate syllable. The (c) case is found in languages such as Akkadian, where an affix *ta* appears between the nucleus and coda of a syllable: /ta+šupdik/ → [šu-ta-pdik] (McCarthy and Prince 1993a), and are at first blush problematic for the proposed theory. We will show in §2.2 that account of such phenomena may place the burden of explanation on syllable structure well-formedness conditions. Pattern (e), as in Yurok, /eg+łkyork^w-/ → łky-eg-ork^w- (Garrett 2001), can be seen simply a case of infixation to a prosodically least-cumbersome syllable structure. And example (f) comes to us from a species of final infixation in Muskogean languages, for example Alabama: /nocihlo+ki/ → noci-ki-hlo (Montler and Hardy 1991); we will discuss such cases more closely in §2.2, arguing that such data are in fact best characterized as infixation over a final syllable.

Moravcsik's typology is expanded considerably by Yu (2003), who considers a larger sampling of some 141 infixation patterns in 101 languages. Where Moravcsik categorizes infixation patterns according to the constituent over which the affix is seen to migrate, Yu couches his typology in terms of 'pivots', segmental and prosodic constituents that may observe infixational exponence on either the left or right edge. The summary results of Yu's typology are somewhat more streamlined than Moravcsik's, but, as is apparent in the diagrams below (where potential infixation sites are marked with "^"), actually instantiate a broader range of potential infixation sites.

(26) A Schematic Typology of infixation types

	Pivot	*Schematized*
edge oriented	First consonant First vowel Final syllable Final vowel	# C V … [C V C]$_{\sigma}$ # ^ ^ ^ ^ ^
prosodically oriented	Stressed vowel	… V́ … ^ ^
	Stressed syllable	… σ́ … ^ ^
	Stressed foot	… ϕ́ … ^ ^

The majority of Yu's 'edge oriented' cases fit into the model of infixation proposed here without elaboration. Infixation over an initial or final consonant is predicted where {ANCHOR >> LINEARITY}, as we saw in Leti. What Yu characterizes as infixation over an initial or final V are very often indistinguishable from infixation over an initial/final syllable, as in Katu; as mentioned above of Moravcsik's 'after the first vowel' pattern, less structurally ambiguous cases such as infixation in Akkadian are reducible to prosodically motivated infixation—in any case, such patterns are not lethal to the predictions of the current theory, as we will see in §2.2.

The single seeming discrepancy between the descriptive range of the Yu typology and the formal predictions of the theory proposed here is found in what Yu terms 'prosodically oriented' infixation, cases of infixation wherein the dislocated morpheme regularly appears adjacent to a particular prosodic head, be it a vowel, syllable, or foot. Some of the flagship examples Yu cites are shown below.

(27) Infixation to prosodic categories

a. Ulwa Infixation (McCarthy and Prince 1993a)
 /bas + ka/ → bas-ka 'hair.POSS'
 /su:lu + ka/ → su:-ka-lu 'dog.POSS'
 /siwanak + ka/ → siwa-ka-nak 'root.POSS'

b. Shuswap Diminutive (Van Eijk 1990, Anderson 1992)
 /RED + pésəɬk^{w}e/ → pépsəɬk^{w}e 'small lake'
 /RED + səp' + ús + …/ → səpúp'skn 'I am hit in the face'

c. <u>English Expletive Infixation</u> <u>(McCarthy 1982, Artstein 2002)</u>
po-fuckin-(tato)
(Ala)-fuckin-(bama)
(abra)-fuckin-ca(dabra), (abra)ca-fuckin-(dabra)

I say there is a 'seeming' discrepancy between typology and prediction here because the above data are beyond the scope of the proposed theory of morpheme order only in light of earlier analytical assumptions concerning them. Building upon previous accounts of infixation as subcategorization to a prosodic head (Broselow and McCarthy 1983, Inkelas 1989), Yu (2003) explicitly espouses a theory in which infixation only happens in natural language to satisfy alignment-inspired attraction of a morpheme to the designated edge of a base-internal constituent—exactly (and arbitrarily) the set of pivots attested in Yu's typology. It is in fact only an analytical bias that necessitates description of the cases above in such terms as 'infixation to head foot', etc. This is not, however, the only way to generalize over the data.

If we hold here to Moravcsik's more traditional characterization of infixation as dislocation over a particular edgebound category, it is observable that in each case above, the infix is always positioned between the head category and a smallest (possibly null) edge-bound unit of some prosodic type. If we take it that infixation such as that found in Ulwa is not simple attraction of an affix to a high-salience prosodic category, but rather positioning of an affix in between prosodic categories that must maintain their internal adjacency relations because of high-ranked domain-contiguity constraints, the full typological range of facts Yu observes falls in line with the predictions of the theory, which, as we noted above, predicts infixation over any prosodic category (σ, foot) or edge-bound segment. As we can see from figure (28) below, this prediction is borne out for categories at both peripheries of the prosodic word.

(28) Attested infixation-over-category

Cat	*Periphery*	*language(s)*
seg	initial	Cambodian (Stemberger and Bernhardt 1998) Leti (Blevins 1999) Arabic (McCarthy 1981) Sundanese (Benua 1998)
	final	Balantak (Broselow 2001) Coeur d'Alene (Reichard 1959) Cupeño (Hill 1970)
σ	initial	Dakota (Shaw 1980) Katu (Costello 1998) Choctaw (Nicklas 1975)
	final	Afar (McCarthy and Prince 1986) Alabama (Montler and Hardy 1991) Hua (Haiman 1980)
Foot	initial	English (McCarthy 1982) Samoan (Mosel and Hovdhaugen 1992)
	final	Ulwa (McCarthy and Prince 1993a)

Again, our designation of English and Ulwa as 'infixation over initial foot' and 'infixation over final foot' respectively may give some readers pause, as these characterizations of the phenomena run exactly counter to prevailing analytic thought on each. We will see in sections to come, however, that the current analysis allows us to cast the problems in a new light, one which leads us to question the descriptive generalization upon which previous accounts have been structured.

Having made clear the application of the theory to cases of infixation over initial segments and syllables, we will proceed to elaborate on the theory as it applies to each of the infixation types noted in figure (28) above. We will see that in all cases some combination of anchoring and domain-contiguity or phonological well-formedness will capture the attested infixation.

2.1. Infixation over (final) segment

The current theory anticipates a counterpart to the Leti case: an instance of immobile or aprosodic infixation in which an underlying suffix infixes over the final consonant of a root. Cases of such infixation for *prosodically* definable reasons are numerous; Buckley (1997), for instance, presents a well-developed analysis of a species of infixation in Kashaya, where a CV suffix infixes over a final consonant only where failure to do so would otherwise result in the emergence of a non-coronal coda.

(29) Suffixation after /l, n, ń, ć/

dahqotol-	dahqotol-ta-	'fail (to do)'
dayec-	dayeć-ta-	'press hand against'

(30) Infixation over /m, q, qw, c/

bilaq^{h}am-	bilaq^{h}a-ta-m-	'feed'
sima:q-	sima-ta-q-	'go to sleep'
qašo:q^w-	qašo:-ta-q^w-	'get well'
duqa:c-	duqa-ta-c-	'get lost'

While the case proves that infixation over final segments is at least *linguistically* possible, it fails to provide any real evidence for or against the particulars of the current theory. What is needed is a case of final-C infixation in which no condition of phonological well-formedness exists to genuinely motivate infixation, and we see such in a case of reduplication observed in the Uto-Aztecan language Cupeño (Hill 1970, Broselow and McCarthy 1983, Crowhurst 1994, McCarthy 1997).

2.1.1. Final-*seg* anchoring and the Cupeño Habilitative

In Cupeño, the habilitative (HAB) form of a number of verbs is expressed with fixed-segment reduplication, as in (a-b) below. In each case, the reduplicant infixes over the final consonant of the root to copy the final vowel up to two times; a glottal stop appears as the onset of each reduplicated syllable. Interestingly, a number of HAB forms show no reduplication at all, (c).

(31) Cupeño Habilitative Formation

a. ʔVʔV reduplication over C]

Root	*Reduplicated form*
čál	čáʔaʔal 'husk.HAB'
tə́w	tə́ʔəʔəw 'see.HAB'

həlʸə́p həlʸə́<u>ʔəʔ</u>əp 'hiccup.HAB'
kəláw kəlá<u>ʔaʔ</u>aw 'gather.wood.HAB'
ʔatís ʔatí<u>ʔiʔ</u>is 'sneeze.HAB'

b. <u>ʔV reduplication over C]</u>
páčik páči<u>ʔi</u>k 'leach.acorns.HAB'
čáŋnəw čáŋnə<u>ʔə</u>w 'be.angry.HAB'
čəkúkʷilʸ čəkúkʷi<u>ʔi</u>lʸ 'joke.HAB'

c. <u>No reduplication</u>
pínəʔwəx 'sing.enemy.songs.HAB'
xáləyəw 'fall.HAB'

The signaling insight of pre-OT analyses (Hill 1970, McCarthy 1979, McCarthy and Prince 1990, Crowhurst 1994) was that the HAB morpheme was mapped onto a prosodic template consisting of exactly two syllables. McCarthy (1997), however, offers a distinctly OT-flavored approach to the problem. First, iambic foot structure in the stem is preserved absolutely in the derivatum in all cases. Second, reduplication of more than one syllable occurs just in case the reduplicant would otherwise fail to be parsed into a maximally binary foot. In brief, these observations lead to an account of the phenomenon in which reduplicative augmentation is achieved through a tension between a) the natural drive towards structural binarity in reduplicated forms, and b) a similarly natural drive to preserve prosodic similarity among derivationally related words. The advantage of such an account over previous attempts is found in its avoidance of the *prosodic template*, a formal artifice eschewed under the Generalized Template Theory of McCarthy and Prince (1994).

Abstracting away from the mono-/bisyllabic variation of the reduplicant for the moment, the case is of particular interest to us because it is not apparent why the reduplicant would fail to appear as a suffix in the (a-b) cases. Presumably, the glottal stop in the reduplicant epenthesizes to avoid vowel hiatus, and in doing so incurs a violation of DEP_{BR}. The reasoning behind this necessary violation runs as follows. After McCarthy (1997), we take ʔ in the reduplicated forms above to be exemplary of *phonological* fixed segmentism, i.e., epenthetic in the manner of Alderete et al. (1999), and thus not a part of the reduplicant underlyingly. External evidence for ʔ's status as an epenthetic segment is found in Hill's (1970) assertion that a "general phonological rule" inserts ʔ after final accented vowels throughout the language; we will discuss this 'rule' in more depth shortly. The question for the time being is why epenthesize a consonant at all, when, by simply surfacing as a single vowel-copy suffix, no DEP violation would be incurred? Were the forms to reduplicate suffixally, /páčik/ → [páčik-i̲], for example, a prosodically unmarked CV syllable structure would be the typical result. No prohibitions against word-final vowels show any effects elsewhere in the data (take *ʔayu*, for example). The segmental make-up of the involved segments does not seem to be of a sort to require dissimilatory augmentation effects. Indeed, it is difficult to imagine a condition on phonological or prosodic well-formedness which would produce the attested infixation. Some higher-ranked constraint must force the DEP violation and it is by no means obvious how such a constraint might be phonological in nature. We will therefore take the case as a genuine instance of aprosodic infixation over a final C, or at least, as a case in which infixation itself is conditioned aprosodically. We make this caveat since, as we will see in the analysis to come presently, various conditions on prosodic well-formedness take effect on the surface realization of the reduplicant itself.

While differing in some formal detail, McCarthy's account of the problem largely presages the program of research embarked upon here. McCarthy argues that various templatic behaviors in Rotuman, Cupeño, and Arabic previously only analyzable under a negative prosodic circumscriptional analysis (McCarthy & Prince 1990a, Crowhurst 1994) fall out naturally when anchoring constraints preserving positional relationships between segments and prosodic categories across morphologically-related output strings are high-ranked in a grammar. In the Cupeño case, the relevant constraint is as shown in informal notation below. When the constraint dominates any constraint on morpheme position, infixation over a final consonant must occur, exactly as with our ANCHOR of the last section.

(32) I-ANCHOR-POS$_{OO}$(Foot, Foot, Final)

> "If a foot-final segment of the OO-Base has a correspondent in the Habilitative output, that correspondent must be final in the foot."

The principal shortcoming of the account is found in its lack of empirical scope. As it happens, there is a patternable class of data which straightforwardly stymie an O-O anchoring-based account—underlyingly vowel-final forms do not reduplicate at all.

(33) No reduplication, V-final forms

Stem	*Habilitative*
čí	číʔ 'gather.HAB'
hú	húʔ 'fart.HAB'
céli	céli 'snip.HAB'
ʔáyu	ʔayu 'want.HAB'
yélici	yélici 'clean.HAB'

The account fails to account for the data because it explicitly permits anchoring of *any* final constituent—final vowels should anchor just as well as final consonants. The effect is shown in tableau (34).

(34) McCarthy (1997): Anchoring conflict

	ʔáyu + RED	I-ANCHOR-POS [(ʔá$_2$)yu]	MORPHREAL
	a. (ʔá$_2$)yu		*!
	b. (ʔá$_2$)(yu-ʔu)	*!	
☞	c. (ʔá$_2$)(yaʔu)		

In the pages to come, we will reconsider the Cupeño problem in light of the mixed Anchoring/D-CONTIG approach to aprosodic infixation proposed in the last section. The account, however, will depend crucially on certain conclusions about the prosody of Cupeño, and so further analysis must be presaged with a brief tangent disputing an assumption thereof. Crowhurst (1994) assumes Cupeño to be essentially iambic in footing; Alderete (2001) recasts this assumption in Optimality Theoretic terms, arguing that a foot-form constraint IAMB dominates its rival constraint TROCHEE.[39] This analysis results in the following foot canon.

(35) Cupeño foot inventory—*iambic*

foot	*example*
$(\sigma_{\mu}\,\sigma_{\mu\mu})$	(ʔi.yú:).nə
$(\sigma_{\mu}\,\sigma_{\mu})$	(hə.nú)va
$(\sigma_{\mu\mu})$	(xə́:)nə
(σ_{μ})	(ʔá)či.mal

The above inventory is puzzling given standard assumptions about iambic foot structure and syllable weight. Hayes (1995), for instance, discerns the prototypical iambic stress system as composed of only two well-formed foot types, $(\sigma_{\mu}\,\sigma_{\mu\mu})$ and $(\sigma_{\mu\mu})$. What are we to make of the appearance of two additional foot types with accented but *light* final syllables, $(\sigma_{\mu}\,\sigma_{\mu})$ and (σ_{μ}), in the above inventory? We might simply attribute it—as does Alderete—to a consequence of constraint interaction. If constraints barring the insertion of vowel length dominate constraints on well-formedness of iambic foot structure, a defective foot inventory is expected to emerge.Such an approach is not unmotivated. Cupeño stress assignment is to a large degree lexical (Hill and Hill 1968), with high-ranked prosodic faithfulness mandating placement of a unique word stress on syllables bearing underlying accent (Alderete 2001). Forms with multiple, lexically

[39] IAMB ≡ ALIGN-R($\acute{\sigma}$, Ft); TROCHEE ≡ ALIGN-L($\acute{\sigma}$, Ft).

accent affixes emerge with cumulative accent on the *final* morpheme, as we would expect in—if not a true iambic system—at least a system that consistently aligns prosodic heads to the left periphery of the prosodic word. This motivates a basic ranking: {RIGHTMOST >> LEFTMOST}.[40]

(36) Rightmost stress among accented suffixes

/yax$_{RT}$ + qál$_{afx}$ + í$_{afx}$/ → yəx-qəl-í
/ʔə$_{afx}$ + yax$_{RT}$ + qál$_{afx}$ + í$_{afx}$/ → ʔə-ya-qal-í

There is, however, a problem. Cahuilla—a Uto-Aztecan language so closely related to Cupeño as to justify Bright and Hill's (1967) designation of them together as the Cahuilla-Cupeño subgrouping—has "an essentially unvarying initial stress rule" (Munro 1990). On the basis of this rule and other facts of secondary stress in the language, Hayes (1995) analyzes Cahuilla's foot structure as being essentially trochaic, with feet composed over mora rather than syllables. As their historical relationship would imply, strong evidence of the same foot structure is found in Cupeño: default stress among unaccented root-affix combinations is uniformly initial.

As Cupeño's stress assignment is largely a product of lexical specification, proof of this fact requires some explanation. In addition to showing culminative lexical stress, Cupeño shows root-dominance of said stress (Hill and Hill 1968); when an accented root appears with an accented affix, as in /pé$_{afx}$ + míʔaw$_{Rt}$/, surface culminativity effects allow realization of stress on the root only, *pemíʔaw*. Alderete argues that this effect is derived through the ranking of faithfulness to root accent over general faithfulness. However, numerous cases are found where an affix surfaces with its underlying stress. An example is found in /né$_{afx}$ + wen$_{Rt}$/ → [né.wen], and we will note that the effect is observed with

[40] RIGHTMOST ≡ ALIGN-R(Prwd, σ́); LEFTMOST ≡ ALIGN-L(Prwd, σ́), McCarthy and Prince (1993).

suffixes as well. These cases may only be explained if roots such as *wen* are underlyingly *un*accented. Otherwise a ranking paradox results. In the one case, faithfulness to root accent must dominate LEFTMOST; in the other, the inverse ranking must obtain. These facts are summarized below.

(37) Summary: Cupeño dominance effects

Root dominance: accented prefix + accented root = root accent
ex. /pé + mí?aw/ → [pe.mí.?aw]
∴ {$\text{FAITH}_{\text{ROOT}}$ >> LEFTMOST}
Affix dominance: accented prefix + unaccented root = prefix accent
ex. /né + wen/ → [né.wen]
Roots such as *wen* must be unaccented, or a ranking paradox emerges:
{$\text{FAITH}_{\text{ROOT}}$ >> LEFTMOST} and {LEFTMOST >> $\text{FAITH}_{\text{ROOT}}$}.

Given the understanding that certain roots are unaccented, the only explanation for forms such as (38) below is that default stress is leftmost in the prosodic word, exactly as would obtain under a basic, trochaic account of the language's prosody, similar in most respects to that of Cahuilla.

(38) Default stress assignment

/wen + em/ → [wénem] ∴ {LEFTMOST >> RIGHTMOST}

Alderete accounts for this fact by positing two types of metrical prominence in the language, stress prominances (grid marks) and stress peaks (accents). On such an account, prominences must align to the absolute left of the word, while peaks must align as far right as possible (modulo lexical accent). Whether or not this is a reasonable account of the facts, we will note that there exists a second construal of Cupeño's prosody fully consistent with almost all of the above data. Were we to make the counter assumption, that the language is simply trochaic, we arrive at the following, considerably simplified foot inventory, where head position is determined by faithfulness to underlying accent or leftmost default.

(39) Cupeño foot inventory—*trochaic*

foot	*example*
(σ σ)	ʔi(yú:.nə)
	hə(nú.va)
	(xə́:nə)
	(ʔá.či)mal
($\sigma_{\mu\mu}$)	(číʔ)

The only fact of the language discussed above which seems incongruous with such an account is found in (36) above. What are we to make of forms in which multiple accented affixes emerge with rightmost accent? For the example UR /yax$_{RT}$ + qál$_{afx}$ + í$_{afx}$/, for instance, how do we derive ultimately stressed [(yəx)(qəlí)], rather than penultimately stressed [(yəx)(qə́li)]? As it turns out, there are a number of approaches we might pursue.

I. *Rightmost-accent-wins results from positional faith.* Word-final syllables are more prominent than word-medial material (Hawkins and Gilligan 1988), a fact put to good use by Beckman (1998) in accounting for previously intractable facts of Spanish and Catalan stress assignment.

II. *Rightmost-accent-wins results from lexical idiosyncracy.* Some suffixes command word-stress no matter their position in the word. E.g., the nominalizing suffix *-í*, as in: /yax + í + qá + t/ → yaxíqat, *yaxiqát. We might, following Revithiadou (1998), argue that this idiosyncracy and the primacy of rightmost suffixes in the cases cited above both result from attraction of stress to the lexical accent borne by the morphosyntactic head of the word in each case. In forms such as *yaxíqat* the nominalizer, a derivational affix, is the head of the word; in *yəxqəlí*, a word bearing only inflectional affixes, the rightmost affix is the morphosyntactic head by standard theories of morphosyntax (Williams 1981, Di Sciullo and Williams 1987, Lieber 1992).

Pursuit of either tack would take us even farther afield, so, in the interests of getting back to the task at hand, we will take it as far from unreasonable that Cupeño might have trochaic foot structure, and move on to an analysis of the language's infixation facts which makes use of this revelation. Below we see exemplar forms from (31) above, appropriately structured according to the rigors of the above discussion.

(40) Trochaic footing and the Habilitative

	Stem	Habilitative
I. RED = ʔV	(pá.či)k čə(kú.k^{w}i)l^{y}	(páči)ʔik čə(kú.k^{w}i)ʔil^{y}
II. RED = ʔVʔV	(čá)l ʔa(tí)s	(čá.ʔa)ʔal ʔa.(tí.ʔi)ʔis
III. RED = Ø	(pí.nəʔ)wəx	(pí.nəʔ)wəx
IV. RED = Ø	(ʔá.yu)	(ʔáyu)
V. RED = Ø	(húʔ)	(húʔ)

Note that, as our parsing of the data shows, we do follow Crowhurst and McCarthy in assuming that, barring a patternable exception to be discussed momentarily, final consonants are uniformly extrametrical. We may account for this fact in a fairly standard Optimality Theoretic manner, with a ranking of FINAL-V[41] over some constraint responsible for parsing consonants into syllables; the retention of the stray consonant in the output string we attribute to high-ranked MAX_{IO}. We take the extrametricality of final consonants to be active at all levels of prosodic structure, syllable, foot, and prosodic word, after Rice (1989); e.g., $[\text{páči}]_{\text{Prwd}}\langle\text{k}\rangle$.

[41] FINAL-V ≡ ALIGN(Prwd, R, V-Place, R), (Inkelas 1998).

(41) Final-C extrametricality: {MAX, FINAL-V >> PARSE}

These understandings of Cupeño metrical structure in hand, we may proceed with an account of the Habilitative. The account will follow the spirit of that proposed by McCarthy, though in efforts to extend the empirical coverage of the account, we will diverge somewhat in formulaic detail from that account, particularly in treatment of types IV-V above. The crux of the analysis is simply that, as in our accounts of Leti and Katu, OO-anchoring of edge-bound segmentism results in displacement of a morpheme from its input orientation. We see this rendered graphically in figure (42) below.

(42) Type I: RED = ʔV; Anchoring forces infixation

	/páčik + RED/	ANCHOR$_{OO}$ (páči)⟨k⟩	MORPHREAL	LINEARITY
	a. (pá.či)⟨k⟩		*!	
	b. (pá.či)ki	*!		
☞	c. (pá.či)ʔi⟨k⟩			*

The augmentation of the reduplicant to two syllables, rather than a minimal one, is accomplished by a TETU ranking of prosodic well-formedness constraints. Rifkin (1999), building on notions that date back to Prince (1980), argues that ternary stress patterns such as the one shown below for Cayuvava[42] are best accounted for with a constraint requiring binarity of the prosodic word, rather than ternarity of the foot. Shown in each case are Rifkin's proposed parses of the forms; '()' are foot boundaries, '[]' are prosodic word boundaries, as usual.

(43) Cayuvava stress patterns

Example	Parse
a. dá.pa 'canoe'	[(σ́σ)]
b. tó.mo.ho 'water container'	[(σ́σ)σ]
c. a.rí.po.ro 'he already turned around'	σ[(σ́σ)σ]
d. a.ri.pí.ri.to 'already planted'	σσ[(σ́σ)σ]

[42] Rifkin reports that other languages showing a similar pattern include Estonian, Yupik, Hungarian, Pirahã, and Negev Bedouin Arabic.

Rifkin argues the shown prosodic structures to result from a tension between the need to produce a minimally binary prosodic word and a need for all feet to be leftmost within that prosodic word. The forms of principal interest are those in (c-d), as non-binarity is necessary in (a), just as non-parsing is necessary in (b), simply because there isn't enough phonological material to allow a fully binary, fully parsed structure. In (c) and (d), it is not so apparent why regular, bipodal prosodic words should not emerge [(σσ)(σσ)] and σ[(σσ)(σσ)] respectively. Rifkin argues the absence of secondary stress in the language to result from the same type of constraint ranking McCarthy and Prince (1993b) use to account for a grammar the optimal candidate to emerges with a single, edge-aligned foot, regardless of the number of syllables in the word: {ALL-FT-L >> PARSE(σ)}.[43] The following constraint is also argued to be active in the language, ranked above PARSE(σ).

(44) PRWDBINARITY ≡ Prosodic words are binary branching. (Rifkin 1999)

PRWDBIN is satisfied by either of the potential structures shown below. Structure (b), however, performs better on ALL-FT-L, since there is only one foot in the prosodic word.

(45) Binary prosodic words

```
a. Prwd          b. Prwd
    / \              | \
   Ft  Ft            Ft \
  /\   /\            /\  \
  σσ   σσ            σ σ  σ
```

Thus when comparing candidates such as [(σσ)(σσ)] and σ[(σσ)σ], the candidate with two unparsed syllables is preferable, even though one of those syllables is completely extrametrical to the prosodic word. A candidate fully compatible with the strictures of ALL-FT-L, such as [(σσ)σσ], however, is ruled out by PRWDBIN, since three prosodic constituents—foot, syllable, syllable—are directly associated to Prwd. The result is an

[43] ALL-FT-L ≡ ALIGN(Ft, L, PrWd, L), McCarthy and Prince (1993); Parse(σ) ≡ Syllables are parsed into feet, (Prince and Smolensky 1993).

optimal, right-aligned prosodic word [(σ́σ)σ], wherein the head syllable is followed by (at most) two light syllables. Consideration the quintisyllabic word gives similar results under the same final ranking, {ALL-FT-L, PRWDBIN >> PARSE(σ)}

Like Cayuvava, Cupeño shows no evidence of secondary stress,[44] and so we take it as not unexpected that surface prosodic words would contain but a single foot; a similar conclusion is reached by Crowhurst and Alderete, though obviously under the differing assumptions of foot structure discussed above. This follows straightforwardly from the same {ALL-FT-L >> PARSE(σ)} ranking found in Cayuvava.

We have only to take it that, under a TETU ranking with relevant faithfulness constraints, PRWDBIN acts as a minimizer on the output shape of the Habilitative, and the Cupeño phenomenon is anticipated by Rifkin's account of Cayuvava stress. Augmentation occurs as the base vowel is copied twice into the reduplicant, to produce a minimally binary prosodic word, as shown below.[45]

(46) PrwdBin as maximizer

	pínəʔwəx + RED	ALL-FT-L	PRWDBIN	PARSE(σ)
	a. (čá)⟨l⟩		*!	
	b. (čá.<u>ʔa</u>)⟨l⟩		*!	
☞	c. (čá.<u>ʔa</u>)<u>ʔa</u>⟨l⟩			*
	d. (čá.<u>ʔa</u>)(<u>ʔa</u>.<u>ʔa</u>)⟨l⟩	*!		

The fact that this only occurs in the Habilitative is a function of the aforementioned TETU ranking. The faithfulness constraints in question must be of the INTEGRITY[46]

[44] Note, however, that Hill (1966) transcribes the Habilitative forms of *čál*, *kəláw*, and *həlʸə́p* as *čáʔáʔál*, *kəláʔáʔáw*, and *həlʸə́ʔə́ʔə́p* respectively. As these are the only examples in which the pattern is reported, we will assume in these cases that the apparent non-culminativity of stress is due to faithfulness to lexical accent between the base and reduplicant vowels.
[45] I am indebted to Markus Hiller for discussion leading to this analysis.
[46] INTEGRITY ≡ No element of S1 has multiple correspondents in S2, McCarthy and Prince (1995).

variety. In Cupeño, INTEGRITY$_{IO}$ is undominated, and as a result, underived mono- and disyllabic roots emerge without any sort of PRWDBIN-inspired augmentation. The same faithfulness constraint holding over the B-R correspondence relation, however, is lower ranked—low enough, in fact, that words reduplicated with the Habilitative morpheme are subject to augmentation of the reduplicant through double-copying of the base vowel.

(47) Binary Prwd in the Habilitative (b) only

mappings	INTEGRITY-V$_{IO}$	PRWDBIN	INTEGRITY-V$_{BR}$
a. /čál/ → (čá)⟨l⟩ ~ *(čá.ʔa)ʔa⟨l⟩	W	L	
b. /čál + RED/ → (čá.ʔa)ʔa⟨l⟩ ~ *(čá.ʔa)⟨l⟩		W	L

Here we see the account's advantage over one forcing augmentation with a binarity condition on foot structure. In McCarthy's account, where iambic footing is assumed, the desired optimum in the above evaluation would be [(čá)(ʔa.ʔa)⟨l⟩]; the candidate bests competitor [(čá)(ʔa)⟨l⟩] through, on such an account, the influence of FTBIN. Thus the reduplicant itself is effectively required to emerge as a well-formed foot, a widely occurring phenomena in reduplicative processes the world over. What the account necessitates, however, is a bipodal output—a surface form with two feet, one the accented first iamb, the second the bisyllabic reduplicant. As mentioned above, there is no evidence of secondary stress in Cupeño, and thus the adducement of the augmentation process to maximal filling of a second, post accentual foot hinges crucially on entirely abstract structure in the output word.

These machinations in place, we turn to consideration of forms in which the reduplicant fails to emerge at all. Why, in bipodal bases such as *pínəʔwəx* (a form with two potential infixation sites, [pí_nəʔ_wəx]), do we not find infixal reduplication in the HAB to satisfy

MORPHREAL?[47] We find that PRWDBIN and ALL-FT-L are again the answer. Effectively, the two constraints prohibit the Habilitative from augmenting when the root itself contains two post-tonic syllables—PRWDBIN violated by double underparsing of syllables in (b), and ALL-FT-L by the exact opposite in (c).

(48) PrwdBin as maximizer

	píṇəʔwəx + RED	ALL-FT-L	PRWDBIN	MORPHREAL
☞	a. (pí.nəʔ)wə⟨x⟩			*
	b. (pí.nəʔ)wə.ʔə⟨x⟩		*!	
	c. (pí.nəʔ)(wə.ʔə)⟨x⟩	*!		

Thus we have accounted for exactly the range of data discussed in McCarthy (1997). In order to fully justify the slight formal reanalysis of the problem as we have proposed it here, however, we must venture beyond the bounds of previous empirical coverage. The real challenge, as stated previously, comes in accounting for Habilitatives of types IV and V, where reduplication fails to occur in vowel- and glottal-final stems.

(49) No reduplication if base is underlyingly V-final

a. Type IV, RED = Ø: bisyllabic base
/ʔá.yu + RED/ → (ʔáyu)

b. Type V, RED = Ø: monosyllabic base
/hú + RED/ → (húʔ)

The approach we will take to these data relies on the domain-contiguity approach we have taken to various types of aprosodic infixation in this work. It is observable that, while we have relied on constraints such as CONTIG-σ to effectively proscribe a constituent over which infixation occurs in languages such as Katu, the same type of constraint may be put to use in delimiting a portion of the base as is impregnable to infixation. We will see exactly this sort of effect in Cupeño.

[47] MORPHREAL ≡ Every input morpheme has some exponence in the output (Samek-Lodovici 1992).

Consider the results of ranking CONTIG-Ft$_{OO}$ above MORPHREAL, along with our previously discussed anchoring constraint. As shown below, this will have the effect of prohibiting any perturbation of the base string—suffixation is ruled out by ANCHOR in the normal way, and CONTIG-Prwd prevents any form of infixation.

(50) Contig-Prwd prevents infixation in V-final forms

	/ʔáyu + RED/	ANCHOR$_{OO}$ (ʔáyu)	CONTIG-Ft$_{OO}$ (ʔáyu)	MORPHREAL
☞	a. (ʔá.yu)			*
	b. (ʔá.yu)ʔu	*!		
	c. (ʔá.y-a)ʔu		*!	
	d. (ʔá.ʔa)yu		*!	

The fact that polysyllabic, vowel-final forms with non-initial stress, such as *ʔiyálmu* 'speak Diegueño', do not allow infixation *before* the stressed syllable is attributable to a number of factors, including: a) the possibility that prosodic words recurse in Cupeño, allowing binary parsing of a form, i.e., [ʔi[(yálmu)]], without violation of ALL-FT-L; or b) the equally likely possibility that high-ranked LIN[2] rules out what would essentially be a case of reduplicative hyperinfixation.

The crucial distinction between CONTIG-Ft and more general (i.e., non-domain) CONTIG is found in consideration of consonant-final forms. The fact that infixation occurs over final consonants follows simply from the fact that said consonants are not technically a portion of the OO-base foot—they are uniformly extrametrical. As a result, CONTIG-Ft will be vacuously satisfied by candidates with infixation over a final consonant, as shown below. General CONTIG, however, would forbid any form of infixation anywhere.

(51) Infixation over O-O extrametrical C

	/páčik + RED/	ANCHOR$_{OO}$ [(páči)]⟨k⟩	CONTIG-Ft$_{OO}$ [(páči)]⟨k⟩	MORPHREAL
	a. (páči)⟨k⟩			*!
	b. (páči)k-i	*!		
☞	c. (páči)ʔi⟨k⟩			

Analysis of the final class of non-reduplicating forms, those ending in glottal-stop, appeals to the same insight. We stated earlier that final consonant are, as a general rule, extrametrical in Cupeño as a result of the ranking {FINAL-V >> PARSE}. Exception to the rule is found in what Hill (1970) calls a "general phonological rule" that inserts *ʔ* after final accented vowels throughout the language. She specifically cites the following non-habilitative examples:

(52) Glottal epenthesis

/pecí/ → [pe(cíʔ)] 'he gathered'
/tevqá/ → [tev(qáʔ)] 'is putting down'

Crowhurst puts this behavior down to a foot binarity requirement; roots in Cupeño never emerge monomoraically in isolation, and in forms with an underlyingly long vowel, no glottal stop is inserted; for example, /ma:/ → *ma* 'leave'. In OT terms, epenthesis results from a ranking {FTBIN >> DEP}, and the fact that glottal stop isn't extrametrical result from it having no C-place features to block the final vowel's access to the Prwd edge. It thus does not violate FINAL-V. How does this affect the present analysis? The fact that *ʔ* epenthesizes to satisfy a condition on moraic weight shows that the consonant is in this case part of the metrical structure of the word, in which case it is subject to both anchoring and contiguity, just as a final vowel would be.[48]

[48] Note that this account is complicated by two factors. One, it requires monosyllabic words with place-bearing final consonants to violate FTBIN, for example [(ca)⟨l⟩]; while this result was similarly necessary in Crowhurst's original account of the data, it remains striking that a language would epenthesizes a glottal to avoid monomoraicity in one case, but fail to parse both morae in the other. Two: Hill (Hill 1970) presents an additional class of data problematic for the current approach. In words with a final *underlying* glottal stop, the Habilitative operates as in other C-final cases, e.g., /kʷaʔ + RED/ → [kʷaʔaʔaʔ]. As the current account exempts final *ʔ* from extrametricality by dint of its surface failure to violate FINAL-V, it remains to be seen why the status of the glottal as underlying or phonologically derived would have any bearing on the application of Habilitative augmentation.

(53) No infixation over final glottal

	/hú + RED/	ANCHOR$_{OO}$ (húʔ)	CONTIG-Ft$_{OO}$ (húʔ)	MORPHREAL
☞	a. (húʔ)			*!
	b. (hú.ʔ-<u>u</u>)	*!		
	c. (hú<u>ʔu</u>)(<u>ʔu</u>)⟨ʔ⟩		*!	

In sum, domain contiguity and anchoring, when ranked above LINEARITY and MORPHREAL, allow us to designate a portion of the output string structurally immutable, not subject to infixation of any sort. Where the final segment of the word's output correspondent is extrametrical, that segment is rendered effectively invisible to the protected domain of anchoring, however, and Habilitative augmentation may occur to fill a dactyl 'template' per the dictates of various prosodic well-formedness constraints in the grammar, shown below.

(54) Final Rankings

a. Aprosodic Infixation		b. Dactyl 'template'	
CONTIG-Ft$_{OO}$	ANCHOR$_{OO}$	INTEGRITY-V$_{IO}$	
	MORPHREAL	PRWDBIN	ALL-FT-L
	LINEARITY	INTEGRITY-V$_{BR}$	PARSE(σ)

2.1.2. The "C or V" problem

As it stands this approach to over-segment infixation does have an undesirable consequence in factorial typology. The use of 'standard' correspondence theoretic anchoring for single-*seg* infixation can lead to an infixational paradigm which shows infixation over a vowel *or* a consonant, depending on the shape of the base. We saw some foreshadowing of this in §1.2; the fact that we were forced to implement other constraints (i.e., domain-contiguity) to rule out the mappings shown below proves quite simply that they are within the scope of our factorial typology.

(55) Unattested "C ∨ V" infixation, Katu

/r + aloom/ → a-r-loom
/r + katas/ → *k-r-atas

No suggestion of such a strategy is found in Moravcsik's (2000) discussion of known infixation types, no in Yu's (2003) typology, and we will take it that such is not a linguistically possible occurance. Yet, as the following tableau demonstrates, the current theory generates the undesirable paradigm with considerable facility. As long as segment anchoring is undominated, infixation must occur over any edge-bound material, be it C or V.

(56) Failure of σ-infixation (repeated from (18))

mappings	L-ANCHOR-*seg*	LINEARITY	CONTIG-σ
/r + aloom/ → a-r-.loom ~ *r-a.loom	W	L	
a. /r + katas/ → *k-r-a.tas ~ ka-r-.tas	W	L	L

The fact that the current theory predicts exactly such a possibility should give us considerable pause, and we may take little solace that it is not, in fact, a new problem. Any alignment-based approach to aprosodic infixation will suffer the same difficulty. The approach of Stemberger and Bernhardt (1998), for example, uses categorical alignment constraints much as we have used anchoring, to force base segmentism to be edgemost in the output. This is achieved under their assumptions with (schematically) a {ALIGN(Root, L, Prwd, L) >> ALIGN(Afx, L, Prwd, L)} ranking. Since neither alignment constraint in the ranking is capable of distinguishing consonants from vowels, the identical problem obtains. Obviously, infixation over the first vowel in this manner is likely to produce a candidate marked along several prosodic lines, and various formal means may be called upon to rule out such infixation on a grammar-specific basis—we have seen them at work in Leti. Nothing, however, rules it out in factorial typology. Similarly problematic is the prosodic subcategorization approach of Yu (2003), which in principle allows for a ranking of morpheme specific alignment such as {ALIGN(Afx, L, C_1, R) >> ALIGN(Afx, L, V_1, R)}. The ranking will force a morpheme, regardless of its segmental make-up, to position itself immediately to the left of the first root consonant or, in its absence, the first root vowel.

One approach to the 'C or V' problem might be to circumvent it altogether by doing away with anchor-*seg* of any form. Since it is observationally true that, in all the cases of infixation we have discussed thus far, either an edgebound consonant or prosodic category (syllable or foot) serves as the pivot over which infixation occurs, we might attempt to develop a theory of anchoring which anchors edge-bound prosodic categories across O-O correspondence relations. We can accomplish this by conflating anchoring constraints with domain contiguity to produce a hierarchy of constraints which anchor the melodic content of prosodic categories *in toto* to string boundaries.

(57) ANCHOR-*Cat*

Cat $\in$ {C, σ, Ft, Prwd}. Let *Edge*(Σ) = the string in *Cat* standing at the {L, R} edge of Σ.
If x = *Edge*(S_1) and y = *Edge*(S_2) then $x\Re y$.

This 'prosodic' anchoring would function just like standard anchoring, except, where standard anchoring only anchors the first/last segment of a string, the above constraint schema 1) allows anchoring with respect to some particular prosodic constituent, and 2) allows anchoring of *everything* in that PCat with respect to some string edge (i.e., segment in position 1 must stay in position 1, 2 in 2, 3 in 3, etc.). Thus the crucial difference is found in the fact that ANCHOR-*Cat* forces category-initial segments, category-final segments, and *all the segments in between* to be identical across the corresponding strings. We can see this represented mor graphically in tableau (58) below.

(58) Katu infixation: /r + aloom/ → ar.loom, *ra.loom

- OO-ANCHOR-σ_1 := Elements in σ_1 of O_{verb} maintain their position relative to edge L in O_{noun}.

	/r + aloom/$_{noun}$	L-ANCHOR-σ_1 [a.loom]	NOCODA	LINEARITY
	a. (<u>r</u>$_1$a$_2$)(loom)	*!		
☞	b. (a$_1$<u>r</u>$_2$)(loom)		*	*

We are left to wonder how such a revision of correspondence theory would affect previous accounts of reduplicative anchoring, however. If we explicitly purge the O-O correspondence domain of anything resembling variable *seg* anchoring, replacing it with the ANCHOR-*Cat* constraints argued for above, it would be theoretically appealing to be able to impose a similar stricture on the B-R and I-O domains. As the following hypothetical example shows, however, such constraints could produce a number of undesirable results when construed over the B-R relation. Consider the result when a prosodic anchoring constraint requiring edge-bound *feet* to be anchored absolutely in the reduplicant. Since the constraint is satisfied (vacuously) when the base contains no right-edge foot, an appropriate ranking will result in reduplication only if the base edge is aligned with a foot boundary.

(59) {ANCHOR-FT$_{BR}$ >> *STRUC >> MAX$_{BR}$} ⇒ reduplicate iff Ft]$_{Prwd}$

a. <u>Even parity forms reduplicate</u>
/diba + RED/ → (di.ba)-(<u>di.ba</u>)
/pubadito + RED/ → (pu.ba)(di.to)-(<u>di.to</u>)

b. <u>Odd parity forms do not</u>
/badupi + RED/ → (ba.du)pi-Ø

This is not attested to my knowledge and seems a strange process for a language to manifest. It is furthermore not predicted by a theory which decomposes 'foot anchoring' into anchoring and domain-contiguity, as we have throughout this chapter. The failure to reduplicate in (b) above would result in violation of a standard anchoring constraint, not satisfaction. Furthermore, the linguistic utility of the traditional formulation of anchoring is difficult to dispute. In addition to being crucial to the account of Cupeño above, it is elsewhere apparent in the realm of base-reduplicant anchoring that some constraint(s) must preserve the edge adjacency of both consonants and vowels indiscriminately, or else common alternations such as those found in Agta below would go unexplained.

(60) Agta plural (Moravcsik 1978)

/RED + takki/ → tak-takki 'leg'
/RED + uffu/ → uf-uffu 'thigh'

Some inroads to the problem might be found in the breaking of anchoring down into subconstraints. Consider the decomposition of ANCHOR-*seg* into C- and V- specific instantiations, below.

(61) Range of infixation, {ANCHOR-{C, V, *seg*} >> LINEARITY}

system	ANCHOR-*seg*		ANCHOR-C	ANCHOR-V
/cv + CVCV/ →	C-cv-VCV	⇒	C-cv-VCV	cv-CVCV
/cv + VCV/ →	V-cv-CV		cv-VCV	V-cv-CV
	↓		↓	↓
	✘ *unattested*		✓ *attested*	✘ *unattested*

We may take figure (61) as indication of two things. First, that there is nothing in principle wrong with consonant anchoring. A constraint anchoring only edge-proximate consonants predicts exactly the facts found in Leti, as discussed above. Second, the above figure suggests that the remaining component of anchoring—vowel anchoring—must undergo some revision, as it is ultimately the source of the "C or V" dilemma. It is observable that in Agta, just as in any case of vowel anchoring, that there exists a mediating level of structure that may be anchored with the same net effect of preserving the edge-orientation of the vowel melody—that level of structure is the moraic tier. Below we see diagrammatically the correspondence relations between morae across two dimensions of faithfulness, the input-output (shown dotted lines) and the base-reduplicant (shown solid lines).

(62) Mora correspondence in vowel anchoring

$$\begin{array}{lcl} & \mu\mu\mu & & \mu\ \ \mu\mu\ \mu \\ \text{/RED + uffu/} & \rightarrow_{IO} & \underline{\text{u.f}}\text{-uf.fu} \end{array}$$

Another approach to the "C or V" problem might simply assume that there is no segmental V anchoring, per se, and that all anchoring of vocalism is accomplished through the intervening anchoring of morae, themselves being autosegmentally anchored to the vowels they govern by other high-ranked faithfulness constraints.[49] We see a formalization of this concept in (63) below.

(63) ANCHOR-$\mu_{S1\text{-}S2}$

Let *Edge*(Σ) = the μ standing at an edge of Σ.
If x = *Edge*(S_1) and y = *Edge*(S_2R) then $x\mathfrak{R}y$.

Constraints of the schema avoid the "C or V" problem straightforwardly, since any system that anchors peripheral [V^{μ} must simultaneously anchor peripheral [CV^{μ}.

(64) Factorial Typology, revised ANCHOR-V

System	*Ranking*	*Mappings*	*Example*
First-C	{ANCH-C >> LINEARITY, ANCH-μ}	/cv + CVCV/ → C-cv-VCV /cv + VCV/ → cv-VCV	Leti
First-V	{ANCH-μ >> LINEARITY; ANCH-C}	/cv + CVCV/ → CV-cv-CV /cv + VCV/ → V-cv-CV	Katu
C or V	*n/a*	/cv + CVCV/ → C-cv-VCV /cv + VCV/ → V-cv-CV	*none*

Unfortunately, such an approach also faces a number of deficiencies. Given the ubiquity of other moraically-defined faithfulness constraints in current theory—for example MAX-μ and DEP-μ, variously necessary in accounts of quantity maximization/minimization (REF?)—the constraints are entirely expected as an addition to our system of relational faithfulness. The *exclusion* of the category V from such formulations, however, is entirely ad hoc. Furthermore, the approach fails to account for the facts of Cupeño discussed above. Mora-anchoring would be necessarily high-ranked in Cupeño to rule

[49] Such as the "NOFLOP" constraint of McCarthy (1997) or more general relational faithfulness to autosegmental association, CONSISTENCY, which we will consider in greater detail in the next chapter.

out reduplication in vowel-final words, but would have to be at the same time violated in consonant-final words, consonant extrametricality being irrelevant to moraic structure; no ranking of mora-ranking and MORPHREAL could predict the attested data. Nor, ultimately, does the approach solve the problem at both edges of the word, since onsets and codas are commonly asymmetric with respect to moraic structure. In a language with positional contrasts in consonant weight, then, we might expect the "C or V" problem to recur, where a final mora-bearing consonant anchors to the right edge of the output word in one member of the paradigm, but a final vowel anchors in another.

Ultimately then we come to an impasse. The traditional segment-generic formulation of anchoring constraints is necessary to accounts of reduplication and infixation, yet falls prey to the observed "C or V" problem. Tentatively, we will offer up the following compromise explanation for this apparent dilemma. Observe that, in cases of prosodically inspired infixation, as in Kashaya or Tagalog, the "C or V" problem should never arise—there are no markedness constraints on syllable structure that treat consonants and vowels in exactly the same light, nor are prosodic well-formedness constraints likely to mandate the 'wrapping' of affixal material with root material crucial to the analysis of Cupeño above. If we may take analogical infixation to be the diachronic morphologization of what was once more widely occurring prosodic infixation in a language, the cross-linguistic absence of the "C or V" pattern is simply a reflex of language learning; learners are never exposed to data suggestive of anything like the pattern, and so never posit the rankings necessary to produce it.[50]

[50] A potential solution to the dilemma might argue that ANCHOR-V universally dominates ANCHOR-C. This would, of course, be entirely stipulative.

2.2. Infixation over σ...more or less

We saw in §1.2 that a combination of segment anchoring and σ-contiguity forced an infix to appear just over the first syllable of the root in Katu; cases of infixation over a final syllable fall quite simply to a very similar analysis. Consider a simple case of such infixation, found in Hua language spoken in New Guinea.

(65) Hua infixal negation (Haiman 1980)

zgavo	zga-ʔ**a**-vo	'not embrace'
harupo	haru-ʔ**a**-po	'not slip'

Here we see a vowel suffix infixing over the final syllable of the root verb and epenthesizing a glottal stop to satisfy prosodic well-formedness conditions. We can account for both infixation and safeguarding of the final σ with the following constraints and the same {ANCHOR, CONTIG >> LINEARITY} ranking we saw in Katu.

(66) CONTIG-σ rules out σ-breaking

	mapping: /harupo + a/	ANCHOR$_{OO}$ [ha.ru.po]	CONTIG-σ	LINEARITY
☞	a. haru-ʔa-po			**
	b. harup-aʔ-o		*	*
	c. harupo-ʔa	*		

We have formulated the analysis with CONTIG-σ here on the assumption that the affix is monosegmental and DEP is low-ranked in the grammar, allowing epenthesis of *ʔ* to avoid medial vowel hiatus. If the suffix were *ʔa*, however, we might just as well rely on prosodic constraints to do the extra work in ruling out a surface form such as *harup-ʔa-o*; if {NOCODA >> LINEARITY}, no such candidate could emerge. The formal indeterminacy here highlights an important fact: that there is often considerable overlap in the formal demands of O-O $\mathbb{F}_{rel}$ constraints and normal markedness constraints.

Of somewhat more interest to the current theory are cases of infixation over a unit nearly—but not quite—the size of a syllable. Our theory of aprosodic infixation predicts a fairly narrow distribution of available landing sights for infixes forced from the outer periphery of the word by high-ranked anchoring. Specifically, we allow for infixes that are positioned over a segment, a syllable, and or a foot (as parsed in morphologically related OO-bases). The naïve prediction, then, is that where an infix appears farther from the underlying edge of affixation than a single segment, it must appear between discernable prosodic units (i.e., σ, Ft). Cases such as the following, where an infix appears over such non-constituents as a) a word-final syllable and the coda preceding it, b) an initial onset and nucleus, and c) a final rhyme[51] would seem to be an immediate challenge for this naïve interpretation of the theory. (Infix shown 'ϕ'.)

(67) Non-constituent infixation

a. Alabama infixation: V-ϕ-C(CV)$_\sigma$#
/talwa + ki/ → ta-kí-lwo

b. Akkadian infixation: #(CV-ϕ-C)$_\sigma$
/ta + puddik/ → pu-ta-ddik

c. Levantine Arabic infixation: (C-ϕ-VCC)$_\sigma$#
/barad + RED/ → bar-b-ad

Of course, in OT, where constraints of all stripes conspire to produce grammatical alternations, it is apparent that factors above and beyond domain contiguity may impact the surface positioning of a morpheme. We will consider each of these cases in abbreviated detail, noting as we proceed that, in each, other factors of prosodic well-formedness conspire with anchoring to produce infixation that is aprosodically motivated, but prosodically conditioned.

[51] While commonly a constituent in simple descriptive characterizations of syllable structure, the *rhyme* has been shown unnecessary in the moraic theory of syllable structure (McCarthy and Prince 1986) we have assumed throughout this work.

2.2.1. Best-fit infixation over σ

It is commonly the case that infixation processes we might characterize typologically as 'infixation over X' are best described as 'infixation over X or Y in context Z', because of some positional allomorphy in the process triggered by the interaction of analogical faithfulness and prosodic well-formedness constraints. We see this kind of faith/markedness interaction clearly in a case of σ_{fin} infixation found in Alabama, where a negation marker *ki* ~ *kii* ~ *ik* infixes over the last CCV or CV of the verbal root (Montler and Hardy 1991) depending on a number of factors best captured through the interaction of a number of constraints above and beyond ANCHOR and LINEARITY.

(68) Alabama infixal negation

a. Vowel Lengthening: VVCV → VkiiCo

affirm.	*neg.*	
hoopa	hokíipo	'not sick'
pakaama	pakakíimo	'not tame'

b. Rhyme Breaking: VCCV] → V*ki*CCo

talwa	takílwo	'not sing'
bassi	bakísso	'not poor'

c. Metathesis: XkV → X*ik*ko

liska	lisíkko	'not beaten'
libatka	libatíkko	'not cooked'
sobayka	sobayíkko	'not known'

Given an underlyingly suffixal orientation for the negation marker, we account for the attested infixation with a by now familiar {$\mathbb{F}_{OO}$ >> LINEARITY} ranking; i.e., /hopa + ki/ → *ho-ki:-po* rather than **hopo:-ki* because of undominated ANCHOR_{OO}.

(69) Infixation ranking

{ANCHOR_{OO} >> LINEARITY} ∴ /hopa + ki/ → ho-kíi-po, *hopóo-ki

An account of the allomorphy facts begins with the understanding that undominated constraints in Alabama require the final syllable of verbs to be extrametrical (Hammond 1993, Lombardi and McCarthy 1993); concomitantly, the iambic foot structure of the language forces the penult to be bimoraic, regardless of its morphological affiliation. The 'vowel lengthening' allomorph above is thus simply the by-product of normal positional weight adjustment in the language.

(70) Iambic lengthening in Alabama

	…σσ	WBP	NONFIN(σ)	DEP-μ
☞	$\sigma^{\mu\mu})\langle\sigma\rangle$			*
	$\sigma^{\mu})\langle\sigma\rangle$	*!		
	$\sigma\sigma^{\mu\mu})$		*!	*

Ex.: /hopa/ → hóopa,
/hopa + ki/ → ho-kíi-po

Every effort is made to avoid such lengthening where possible, however. If the base is ~VCCV], as for example *talwa*, below, the infix breaks up the rhyme of the penult syllable. This allomorphy—most troublesome for our theory of infixation, infixation over 'CCV'—results from the ranking of DEP-μ over LINEARITY. DEP-μ must rule out perfect intersyllabic infixation (i.e., [...σ-ki-σ]) as a root coda is pressed into service to maintain a heavy penult, co-opting the base coda to maintain the weight requirement in the penult without epenthesizing a mora. (NB: the raising of the stem-final vowel is systematic in the paradigm and irrelevant to the operation of infixation.)

(71) Avoidance of weight adjustment

	/talwa + ki/	DEP-μ	LINEARITY
☞	a. (ta.-ki-l)wo		***
	b. tal(-ki:-)wo	*!	**

Thus the mysterious 'CCV' kernel of infixation is obtained without recourse to domain-contiguity of any form.

For completion, we will consider the behaviors of the third allomorph. If the final syllable of the base of affixation begins with *k*~, the *ki* infix metathesizes internally, its *k* forming a geminate with that of the base. This constitutes a violation of the same constraint we argued in the last chapter to rule-out homomorphemic metathesis in Tagalog infixation: HOM(omorphemic)LIN(earity). We will take crucial violation of the constraint to result from its subordination to a simple phonotactic: a dissimilatory markedness constraint banning sequential *k*-onsets, OCP(ons).

(72) $_{\sigma}$[k… $_{\sigma}$[k avoidance in Alabama forces metathesis

	/liska + ki/	OCP	HomLin
☞	a. (li.s-ik-)ko		*
	b. (li.-ki-s)ko	*!	
	c. lis(-ki:-)ko	*!	

HomLin is elsewise crucial in the ranking to prevent the same metathesis elsewhere, as shown below.

(73) Metathesis ruled out elsewhere

	/hopa + ki/	HomLin	Dep-μ	Linearity
☞	a. (ho.-ki:-)po		*	**
	b. (ho.p-i)k-o	*!		*
	c. (ho.p-i:)k-o	*!	*	*

Thus 'final-σ' infixation is achieved without specific recourse to domain-contiguity constraints, and a 'cooperative' effect is seen here between the faithfulness and markedness constraints, suggesting that really the two general infixal ranking schemas we have suggested, {$\mathbb{F}_{OO}$ >> Linearity} and {$\mathbb{M}$ >> Linearity} are in actuality idealized poles of a spectrum of possible—analogically motivated but prosodically shaped—infixation types.

(74) Final Alabama ranking

OCP   Anchor$_{OO}$

HomLin

|

Dep-μ

|

Linearity

Note that an analysis more dependent upon $\mathbb{F}_{rel}$ can supplant a prosodic account in this case and many others like it. Where the above account rules out infixation over the final segment (with concomitant affix-internal metathesis, **hop-ik-o*) with a ranking of

HOMLIN over DEP-μ—a ranking which in turn was only possible where {OCP >> HOMLIN}—we might instead have ranked CONTIG-σ_{OO} sufficiently high in the grammar to rule out a candidate **hop-ik-o* without any particular dependence on the ranking of the above constraints. This is not true of all cases of prosodically motivated/conditioned infixation, however. Since the onset is not PCat in the current theory, the facts of languages such as Yurok, where an infix is positioned over a word-initial cluster (Garrett 2001), are only captured with a {M >> LINEARITY} ranking. In any case we do not take redundancy in this area to be necessarily troublesome, as it is suggestive of a diachronic trend toward morphologization of a general grammatical process. Infixation might start out as a prosodic process and over a language's evolution become an analogical, purely morphological process applicable only in a small portion of the lexicon. The individual language learner's task of distinguishing the two analyses in the synchronic case we might simply attribute to a bias in the acquisition device. If, as argued in Prince and Tesar (1999), optimality theoretic learners are biased against the ranking of faithfulness constraints in the learning of phonotactic distributions, we would expect that, when presented with data that might equally lend itself to a {M >> LINEARITY} or {F_{OO} >> LINEARITY} ranking, the learner should learn the {M >> LINEARITY} ranking in an attempt to produce the most restrictive possible grammar.

2.2.2. Infixation over μ?

Under standard assumptions of syllable structure—i.e., that syllable-internal branching is universally of the form $[C_0[V]_\mu[X_0]_\mu]_\sigma$—the onset and nucleus of a syllable do not comprise a constituent independent of that syllable's coda. Yet in Akkadian (McCarthy and Prince 1993a), aprosodic infixation occurs *within* the first rhyme—between the vowel and coda consonant—of the first syllable of the base of affixation. If no prosodic conditioning factors may be found to otherwise massage the infix into its observed position, the present theory is at a loss to explain these facts.

(75) Infixation in Akkadian (McCarthy and Prince 1993a)

Basic Verb	*ta-Infixed Verb*	
pud.dik	pu-.ta-d.dik	D Form (causative/factive)
šup.dik	šu-.ta-p.dik	Š Form (causative)

A potential account of these data would involve an enrichment of our theories of domain-contiguity and syllable structure. A number of authors have argued from speech error data and CVC blending experiments {{kobuzono; derwing yoon cho, 1993}} and from more formal concerns (Mester and Ito 1989) that some languages show an intrasyllabic organization very different from that found in English, one in which the initial CV of the syllable is a constituent. Ito (1989), for instance, argues that the epenthesis facts of Cairene and Iraqi Arabic require segment/mora parsing of the following form.

(76) The sub-moraic onset

```
  μ μ
 /| |
C V X
```

If we take it that Akkadian is similar to Arabic in its sub-syllabic organization,[52] and that the governed constituents of a mora may constitute a contiguity domain just as the governed constituents of a syllable or foot would, we might account for the facts of Akkadian with exactly the same ranking arguments used for Katu infixation.

[52] Kobuzono {{kobuzono}} and Beckman {{Beckman, response to kobuzono}} observe that psycholinguistic experiments putatively constituting proof of the [CV][X] syllable organization are affected a great deal by orthographic knowledge; Japanese and Korean, for example, both have CV-oriented writing systems, and not surprisingly their speakers are much more likely to consider initial CV a constituent than English speakers are. Not surprisingly, Akkadian was also written in a (cuneiform) syllabary (Buccellati).

(77) Moraic structure of the Akkadian word and resulting infixation

Moraic Structure	*Infixation Ranking*	*Resultant Mapping*
μ μ μ μ p u d d i k	L-ANCHOR, CONTIG-μ >> LINEARITY	/ta + puddik/ → pu-ta-ddik

Such an account would, in its effective delimitation of a mora-sized domain of the base immune to discontiguity under infixation, follow very much the intent, if not the formal machinations of McCarthy's (1993) prosodic-subscriptional account of the phenomenon. However, it is observable that this is not the only way to predict the kernel of infixation in Akkadian in OT. Buccellati (Buccellati) observes that Akkadian syllables do not allow complex onsets; clusters never occur word-initially and sequences of maximally two consonants are allowed medially, i.e., heterosyllabically. Given this otherwise undominated constraint on the Akkadian grammar, deriving the attested infixation pattern is a relatively straightforward matter. High-ranked L-ANCHOR forces some exponence of the root to maintain its edge-adjacency across morphologically related strings, and high-ranked *CXONS prevents infixation over the lone onset consonant of the root.

(78) Akkadian first-V infixation

	/ta + puddik/	L-ANCHOR$_{OO}$ [pud.dik]	*CXONS	LINEARITY
	ta-.pud.dik	*!		
	p-ta-ud.dik		*!	*
☞	pu-.<u>ta</u>-d.dik			**
	pud-.<u>ta</u>-.dik			***

In the face of this relatively straightforward account of the problem, it remains to be seen whether mora-contiguity, as a formal device, and sub-moraic onsets, as a representational possibility, are necessary to our theory of CON. In any event, we see again in the above account that very often the outputs of what we have termed 'aprosodic' infixation are commonly impacted on by the rigours of prosodic well-formedness in the grammar,